ANNUAL REPORT

OF THE

County Medical Officer of Health,
County Donegal

ON THE

Health and Sanitary Conditions
of the County

AND ON THE

County School Medical Service

YEAR 1939

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Srath an Urláir,

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Do Chathaoirleach agus Comhaltaí,

Chomhairle Chonndae Dhún na nGall.

A Dhaoine Uaisle,

Is mór agam d'onóir an cuntas cinn-bliadhna seo do chur fé nbhúr mbrághaid fé mar atá de dhualgas orm do réir na n-ordughadh so leanas: Ordughadh na Liaigh-Fheadhmannach Conndae, 1926, agus Ordughadh Sláinte Puiblidhe (Liaigh-Riaradh Leanbhaí) a 1920.

Mise, le meas,

M. BASTABAL,

Liaigh-Fheadhmannach Conndae.

Aibreán, 1940.

DONEGAL BOARD OF HEALTH

Staff of Public Health Department
Year Ending 31st December, 1939

County Medical Officer of Health ;
M. S. BASTABAL, M.D., D.P.H. (M. J. BASTIBLE).

Assistant County Medical Officers of Health :
M. J. McCOLGAN, M.B., B.Ch., B.A.O., D.P.H., B.Sc., L.M.
R. HAYES, M.B., B.Ch., B.A.O., D.P.H., B.Sc. (P.H.), L.M.

County Ophthalmic Surgeon (Part Time) :
G. O'DONNELL, M.B.

School Dental Officers (Part Time) :
JOSEPH R. KELLY, B.D.S.
J. VINCENT CALLAGHAN, L.D.S.

Public Health Nurses :

Full Time—Miss Anne Casey.
Miss Margaret T. McLaughlin.
Miss A. J. Meehan (Temporary appointment from June, 1938).

Part Time—The Jubilee and Dudley Nurses employed in the following areas :—Annagry, Ardara, Arranmore, Ballybofey and Stranorlar, Ballyshannon, Bruckless, Buncrana Bundoran Carndonagh Carrigart, Clonmany, Convoy, Derrybeg, Donegal, Doochary, Drumholm, Dunfanaghy, Dungloe, Fahan and Inch, Fanad Upper, Fanad Lower, Frosses, Glencolumbkille, Gortahork and Falcarragh, Kilcar, Letterkenny, Lifford and Castlefin, Moville, Muff and Upper Moville, Ramelton, Rathmullan and Glenvar.

Clerk : Séamus Ó Ceallaigh.

PART I

ANNUAL REPORT

OF THE

County Medical Officer of Health County Donegal

ON THE

Health and Sanitary Conditions of the County

YEAR 1939

Annual Report on the Health and Sanitary Conditions of the County

YEAR 1939

POPULATION

The population of County Donegal, comprising an area of 1,193,581 statute acres, was 142,310 according to the revised Census of 1936. The population for the several years from 1821 to 1936 was as follows :—

1821	....	248,270	1881	....	206,035
1831	....	289,149	1891	....	185,635
1841	....	296,448	1901	....	173,722
1851	....	255,158	1911	....	168,537
1861	....	237,395	1926	....	152,508
1871	....	218,334	1936	....	142,310

The following shows the distribution of the population according to Urban and Rural Districts since the Census of the year 1911.

DISTRICT	1911 Census	1926 Census	1936 Census
URBAN DISTRICTS.			
Buncrana U.D.	1,874	2,309	2,295
Bundoran U.D.	2,116	1,339	1,351
Letterkenny U.D.	2,194	2,308	2,649
RURAL DISTRICTS.			
Ballyshannon R.D.	7,772	7,509	6,628
Donegal R.D.	19,616	16,552	14,780
Dunfanaghy R.D.	15,471	14,252	13,559
Glenties R.D.	32,800	30,081	27,562
Inishowen R.D.	33,837	30,545	28,285
Letterkenny R.D.	9,961	8,782	8,496
Milford R.D.	19,293	16,884	15,497
Stranorlar R.D.	23,503	21,947	21,090
TOTALS	168,537	152,508	142,192

Letterkenny, Buncrana, Bundoran, and Ballyshannon are the four largest towns in Donegal.

The following table shows the population of the towns in County Donegal, according to the 1936 Census.

Towns with Population over 200		Towns with Population under 200	
Town.	Population.	Town.	Population.
Letterkenny	2,649	Creeslough	199
Buncrana	2,295	Cross Roads	171
Ballyshannon	2,223	Killygordon	165
Bundoran	1,352	Kilmacrenan	155
Donegal	1,315	Carrigans	154
Moville	937	Clonmany	123
Rathmelton	924	Carrowkeel	120
Raphoe	754	Kilcar	117
Ballybofey	736	Manor Cunningham	117
Carndonagh	660	Carrickart	115
Killybegs	631	Muff	114
Dungloe	593	Carrick	112
Lifford	478	Malin	112
Stranorlar	462	Culdaff	95
Ardara	442	Ballindrait	91
Rathmullan	402	Laghy	85
Dunfanaghy	386		
Milford	377		
Castlefin	374		
Convoy	369		
Glenties	360		
Mountcharles	313		
Ballintra	287		
St. Johnston	272		
Pettigo (pt.) (*a*)	251		
Dunkineely	235		
Newtown Cunningham	207		

(*a*) The remainder of the town of Pettigo is in District Electoral Division of Clonelly, Fermanagh County.

The following figures of population for the whole of Ireland are of interest inasmuch as they show that the steady decline in population in County Donegal almost exactly parallels that for the Country as a whole :—

1831	7,767,401
1841	8,175,124
1851	5,552,385
1861	5,798,967
1871	5,412,377
1881	5,174,836
1891	4,704,750

1901	....	....	....	4,458,775
1911	....	....	....	4,390,219
1926	F.S.	2,971,992	....	
	N.I.	1,256,561	....	4,228,553
1936	F.S.	2,965,854	....	
	N.I.	1,279,753	....	4,245,607

VITAL STATISTICS.

1.	Population	142,310
2.	Number of Births	2.448
	Rate per 1,000 of the Population	17.2
3.	Number of Marriages	688
	Rate per 1,000 of the Population	4.7
4.	Number of Deaths from all causes	2,044
	Rate per 1,000 of the Population	14.4
5.	Number of Deaths from Tuberculosis (all forms)	128
	Rate per 1,000 of the Population	0.9
6.	Number of Deaths from Pulmonary Tuberculosis	101
	Rate per 1,000 of the Population	0.7
7.	Number of Deaths from other forms of Tuberculosis	27
	Rate per 1,000 of the Population	0.2
8.	Number of Deaths from Influenza	86
	Rate per 1,000 of the Population	0.6
9.	Number of Deaths from Cancer	158
	Rate per 1,000 of the Population	1.1
10.	Number of Deaths of Infants under 1 year	132
	Rate per 1,000 Births	54
11.	Number of Deaths from Principal Epidemic Diseases*	28
	Rate per 1,000 of the Population	0.2
12.	Number of Deaths from Diarrhoea and Enteritis in children under 2 years of age	2
13.	Number of Successful Primary Vaccinations	1,844

14.	Number of Deaths from Puerperal Sepsis	2
	Rate per 1,000 Births	0.8
15.	Number of Deaths from other Puerperal Conditions	10
	Rate per 1,000 Births	4.1
16.	Uncertified Deaths	633
	Percentage of total Deaths	31
17.	Number of Deaths of persons over 65 years	1,187
	Percentage of total Deaths	58.1

(Death Rates are calculated on the population figures according to the Census of 1936, revised).

* Principal Epidemic Diseases :—Enteric Fever, typhus, smallpox, scarlet fever, whooping-cough, diphtheria, dysentery and diarrhoeal diseases.

UNCERTIFIED DEATHS.

As Dr. Musgrave, County Louth, mentioned in his annual report last year a large number of uncertified deaths is apt to vitiate statistics of morbidity and mortality from disease. This applies with especial force to tuberculosis which is apt to be undiagnosed in some cases and perhaps glossed over in others—for various reasons. As Dr. Musgrave so correctly puts it: "Strictly speaking a true death-rate from tuberculosis—or any other death-rate—is only to be found where there are no uncertified deaths. Uncertified deaths are, of course, graded by the Registrars of Deaths, according to knowledge, or forming their judgment from a description of circumstances and symptoms given them by the person recording the death."

County Donegal, unfortunately for the accuracy of our statistics, has a very large number of deaths uncertified (practically one-third of all the deaths occurring in 1939). There was a similar number of cases last year, the cause of whose death was intimated to the Registrar General as unknown. It is hoped that this high percentage of uncertified deaths may be reduced fairly rapidly, as otherwise our statistics must be very uncertain and possibly unreliable.

The following list taken from preliminary returns furnished by the Registrar-General shows the percentage of uncertified deaths for the different Counties, County Boroughs, etc., in Eire, arranged according to increasing percentages:

UNCERTIFIED DEATHS, 1939.

(Percentage of Total Deaths).

0.6	County Dublin.
1.5	City of Dublin.
1.8	Cork County Borough.
3.0	Limerick County Borough.
3.2	Waterford County Borough.
4.6	County Kildare.
5.9	County Louth.
7.1	County Wicklow.
8.8	Tipperary South Riding.
9.8	County Meath.
10.0	County Waterford.
12.3	County Laoighis.
12.4	County Kilkenny.
13.0	County Wexford.

13.7	County Limerick.
14.0	County Westmeath.
16.0	County Cork.
16.6	Eire.
16.9	Tipperary North Riding.
17.0	County Offaly.
17.1	County Carlow.
17.3	County Monaghan.
24.6	County Cavan.
24.9	County Clare.
26.1	County Sligo.
28.2	County Kerry.
31.0	County Donegal.
32.0	County Galway.
35.5	County Roscommon.
36.9	County Longford.
37.7	County Mayo.
39.0	County Leitrim.

The figures for the Provinces are roughly as follows:—

Leinster	1 in 14
Munster	1 in 7
Connaught	1 in 3
Ulster (part of)	1 in 4

INFECTIOUS DISEASES.

The Infectious Diseases notified during the year 1939 are classified in the accompanying Table, opposite the Dispensary Districts in which they occurred :

Dispensary District	Tuber-culosis	Enteric Fever	Diph-theria	Scarlet Fever	Puerperal Fever
Ardara	1	—	—	—	—
Ballintra	—	—	—	—	—
Ballyshannon	2	—	—	—	—
Buncrana	4	—	—	16	—
Carndonagh	—	—	2	3	—
Carrick	6	—	8	—	—
Castlefin	5	—	—	13	1
Churchill	1	—	—	—	—
Cloghan	3	2	—	—	—
Clonmany	3	—	5	1	—
Cross Roads (Falcarragh)	4	—	10	1	—
Cross Roads (Bunbeg)	—	1	5	—	—
Donegal	1	1	—	1	—
Doochary	—	—	—	—	—
Dunfanaghy	—	1	2	—	—
Dungloe No. 1	—	—	1	1	—
Dungloe (Burtonport)	5	—	4	—	—
Dungloe (Arranmore)	4	—	—	—	—
Dunkineely	2	1	—	6	1
Fanad	1	2	—	—	—
Glenties	8	1	—	—	—
Kilderry	1	—	—	8	—
Killea	—	—	—	2	—
Killybegs	—	—	1	—	—
Killygordon	4	—	—	—	—
Kilmacrenan and Milford	5	1	14	1	—
Leghey	—	—	—	—	—
Letterkenny	—	1	—	8	—
Malin	—	—	—	—	—
Manorcunningham	—	—	—	—	—
Moville	4	1	—	20	—
Pettigo	—	—	—	—	—
Ramelton	1	—	2	1	—
Raphoe	4	—	—	3	—
Rathmullan	1	—	—	—	—
Rosguill	1	1	—	—	—
Stranorlar	—	—	—	8	—
‡Tanatallon	2	—	1	3	—
TOTAL	73	13	55	96	2

‡ 1 case of Cerebro Spinal Meningitis occurred in this district.

ENTERIC FEVER.

Thirteen cases were reported with one death. Of these thirteen cases, ten were typhoid, two were paratyphoid-B, and one was presumably paratyphoid-A, although the organism was not actually isolated, and therefore the proof is not conclusive. On two separate occasions the blood from this patient agglutinated paratyphoid-A organisms at a titre of 1/50.

Two of the typhoid cases, one of whom died, occurred in brothers who were working on a farm for a few months prior to their illness. On investigation it was discovered that there had been cases of typhoid in the members of the household occupying the farm some eight years previously. Another case in the same district last year was found to have obtained milk from this farm on one occasion. Unfortunately it was not possible to persuade the members of the suspected family to allow of tests being made in order to ascertain if one of them was a carrier.

In none of the remaining cases was it found possible to trace the exact origin of the infection. The great majority admitted the drinking of unprotected surface-water (in some cases from shallow wells on cultivated land) at some period prior to their illness, but none of these sources was definitely incriminated, although such of them as could be tested were found to be badly polluted with other organisms.

The real cause of typhoid fever is the swallowing of living typhoid bacilli, whether in infected water, milk or other food. To borrow a phrase from Dr. Heiser ("Odyssey of an American Doctor"): "You can eat typhoid and you can drink typhoid, but you cannot catch it."

The very high incidence of typhoid fever up to forty years ago was due to the prevailing pollution of water supplies by sewage from cesspools, privies, etc. The drainage system of houses was not adequate to isolate water and food storage supplies from pollution by sewage contamination. In consequence of the prevalence of the disease, "carriers" must have been very numerous, so that the chances of sewage being contaminated from the excretions of these "carriers" must have been very great. In this manner a vicious circle was established, the high number of cases producing a proportionately high number of carriers, whose excretions caused further cases—and so on. At the present time owing to the diminishing incidence of typhoid in these countries, the chances of sewage being contaminated with such excretions (from bowel and kidney) are much fewer. Improved sanitation has almost abolished the danger of

houschold infcction of food and watcr. Dust and flics play a ncgligible part in non-tropical countries as a rule, espccially in view of the improved street sanitation of towns and cities. In country districts, however, the water supply and sanitation of villagcs still lcave much to be desired. Contaminated milk and watcr are found to be the cause of most large outbreaks in reccnt years.

The enteric infections—typhoid and paratyphoid—arc vcry difficult to diagnose in the early stages, and thus other members of a family are liable to become infected bcfore the true diagnosis has been established. The variable character of the illness appears to be much more marked than it was some thirty years ago. Thus a suddcn rise of temperature with chillincss, headache, general pains, cough and nasopharyngeal catarrh may give a picture resembling influenza, or even acute rheumatism, or catarrhal cold. In thc comparatively recent Croydon epidemic somc cases began with abdominal discomfort, furred tongue, diarrhoea alternating perhaps with constipation, and very slight pyrexia. This condition persisted for several days without severe symptoms. The mildness of the initial symptoms led to a lack of adequate care and failure to seek medical advice in the early stages. In consequence some cases ran a very severe and prolonged course of illness, with fatal result in a few.

Other cases began with acute pyrexia and abdominal pain, with tenderness over the appendix or gall-bladder. The clinical picture resembled appendicitis or cholecystitis, and laboratory tests were necessary to arrive at an exact diagnosis.

In our Donegal cases, headache and constipation were the outstanding symptoms in four cases, headache and abdominal pain in three, onc patient had sevcre diarrhoea, one complained of pain in the cardiac region, and one (a boy of ten) was delirious for two weeks, but made a good recovery. I do not recollect having seen a case of typhoid so far in which hcadache did not occur at the start of the illness. Usually the headache is severe and intractablc, and lasts for 3—7 days. In cases of paratyphoid, headache sccms to be mild, and may be present only for a day or so. Most of our patients had been ill on thcir feet for onc or two wecks bcfore taking to their beds.

In conclusion I would like to quote again from Dr. Hciser's stimulating book: "Cholera, typhoid fever and dysentery are due to soil pollution. No one would think of throwing a substance known to be poisonous into the yard, or leaving it uncovcred in the house; yct human wastes arc more dangcrous than arscnic or strychnine, and a thousand times more likely to be carried to the supply of drinking watcr, or to be brought into contact with the food, than are vegetable and nincral poisons."

TYPHUS FEVER.

A case of suspected typhus fever was reported on 25th December. The patient was a young woman of 28 years who was sent to hospital on 22nd December and died the following day. A sample of blood taken on the day of admission to hospital gave a positive Weil-Felix reaction of 1/75. All the contacts were removed to hospital. Two children had temperatures of 102 degrees to 104 degrees for a few days and then returned to normal. Blood samples from these contacts gave positive Weil-Felix reactions varying from 1/25 to 1/50. One of the children was suffering from a running ear. Two of the samples also gave positive agglutination (1/50) with typhosus —0, and on further investigation one of these was found to be a group reaction, as the serum caused H-agglutination with Gaertner's bacillus. The bacteriologist therefore concluded that the typhosus —0 agglutination observed was due to a present or recent Gaertner infection (food-poisoning group) rather than to the typhoid bacillus. There was no history of present or previous illness to confirm this diagnosis in the contact under consideration. All the contacts were said to have been in a very verminous condition. The patient had evidently been cleaned up before admission. The local medical officer of health burned the patient's dwelling to the ground on 23rd December. It was a wretched hovel.

The patient complained of sore throat, dizziness and headache for the first time on or about 15th December. According to her mother's evidence, sore throat was the outstanding complaint up to removal to hospital, and the local medical officer of health states that he found her throat inflamed at his first visit (21st December), while the temperature was 104 degrees. The patient had evidently fallen against a table when she tripped over something in the house and had sent for the doctor as her eye was badly bruised. The next day the patient developed a blotchy rash on the thighs and was uneonscious on admission to hospital.

Now it is very difficult to make a definite diagnosis in this case, especially as the patient was not seen by any officer of the Public Health Department. Actually in my final report to the Local Government Department I stated: "I do not consider that we have unequivocal proof that the case was actually typhus. On the whole, while nccessarily speaking with reserve in view of my not having seen the case personally, I am of opinion that there is not sufficient evidence available to allow of this infection being definitely notified as typhus fever."

I bascd the above tentative conclusion on the following facts :—

(1) Experts are fairly unanimous that a positive Weil-Felix up to 1/200 is not of itself diagnostic of typhus fever.

(2) The chief complaint was sore throat, which is not a symptom of typhus.

(3) In a patient so gravely ill one would expect a high agglutination titre with the Weil-Felix test.

(4) None of the contacts gave a high agglutination with the Weil-Felix test, although two of them were ill.

(5) The rash in typhus is said to be localised principally on the upper limbs, and spreads all over the body, especially on the back. In this particular case it would seem that the rash was confined to the thighs. It must be added, however, that the two medical men who saw the case have had previous experience with typhus fever, and they were both of opinion that the woman presented all the clinical appearances of a genuine case. Unfortunately the patient's chart was burned, so that no accurate records of the pulse and temperature were available.

(6) There have been no cases of typhus fever in County Donegal since 1931, and neither this patient nor the contacts had been out of the County for years. There was no previous history of a similar infection in any of them.

(7) A further point of interest is that agglutination results in the contacts were highest with Proteus XK and only 1/8 to 1/25 with Proteus X19. It would appear, however, that louse-borne typhus, as found in these Countries, gives a high positive agglutination with Proteus X19, and a negative or very low titre with the Kingsbury strain.

It may, perhaps, be of interest to recall that there are at least four groups of fevers of the typhus group. They are as follows :—

Epidemic typhus — (1) louse-borne.
Non-epidemic typhus : (2) flea-typhus.
(3) tick-typhus.
(4) mite-typhus.

Louse-borne typhus is communicated to man by the body-louse usually, though capable of transmission by the head louse also. The disease is believed to arise from the infective excretions of the louse getting into the minute puncture made by the insect in sucking human blood, or through an abrasion of the skin. The other three varieties of the disease are usually encountered only in tropical and semi-tropical countries.

The causative organism is believed to be a virus, "Rickettsia prowazeki." It is present in the blood and organs of a patient in the acute stage of the disease, and to a lesser extent during convalescence, but soon ceases to be transmissible by lice, even though it is believed to persist for long periods in the bodies of those who have recovered from the disease.

As mentioned in last year's report Dr. Mosing in Poland has found "Weigl's reaction" to be definitely diagnostic in typhus fever. Unfortunately, rather specialised laboratory facilities are required for this test, and are not available, so far as I am aware, in this Country. The test consists in testing the patient's blood-serum against a suspension of Rickettsia prowazeki, and is found to be quite specific.

All the different varieties of typhus are caused by invasion of the patient's body by the minute parasites spoken of as Rickettsiae. These minute bacillus-like things belong to a group which probably acquired its first parasitism on insects. Thus parasites of this order have been seen in sheep lice, in dust lice, in bed bugs, in mosquitoes, in fleas, in mites and in ticks. The name was given them by da Rocha Lima in honour of two intrepid and famous investigators, Ricketts and Prowazek. The former, an American, died of typhus contracted while studying the disease in Mexico City. Prowazek, an Austrian, died from the same disease, contracted in a similar manner. The Rickettsiae needed a name for themselves, because they cannot be logically grouped either with the bacteria or the protozoa. They differ from true bacteria largely in their response to ordinary dyes, in their refusal to grow on artificial media other than those which contain living cells, and by the fact that in the living animal as well as in the tissue culture they multiply only within the cell bodies themselves.

The body and the head louse, as already explained, carry the infection from one human being to another. The louse takes up the virus with infected blood, the Rickettsiae multiply in the cells living in its stomach and intestinal walls, and appear in large numbers in the faeces. Louse transmission was the great discovery made by Nicolle which furnished the first powerful weapon for a counter-attack against the disease. It explained the manner in which epidemics are propagated. It removed all mystery from the historic association of typhus epidemics with wars, famines and wretchedness. It left unanswered, however, the question of the persistence of infection during inter-epidemic periods. For the human louse is even more susceptible than man. It sickens and dies from the infection within 12—14 days.

It is now believed that louse-borne infection persists in the human body indefinitely. The mild eases of typhus that oeeur in Ameriea, known as Brill's Disease, are probably reerudeseenees of infections aequired in childhood in the native heaths of classical typhus. Although hundreds of these eases have oeeurred in New York alone sinee 1910 there has been no ease in whieh the infeetion has been eonveyed to other persons, so that the virus must have lost its power to infeet lice.

The persistenee of the virus of louse-borne typhus in inter-epidemie periods is still somewhat of a mystery. Megaw believes that the maintenanee of infeetion during periods between epidemies is probably by means of mild inapparent attaeks, espeeially in ehildren. It has also been shown, in this eonneetion, that if the infeeted faeees of the louse are kept dry at room temperature the Riekettsiae may remain alive and virulent for at least 66 days. " This long survival in dried faeees under natural eonditions may be of great epidemiologieal importanee, for it might explain the sudden appearanee of the disease after an interval in whieh it has not been observed. It is also of great teehnieal importanee for it allows one to preserve strains, or to send them to other workers." (Buxton).

It is not exaetly known when typhus first reaehed Ireland, whieh later beeame an impregnable stronghold of the disease. Murehison says that the first preeisely-reeorded epidemie was that at Cork in 1708, but there is reason to believe that, as the " Irish Ague," it had existed long before that time. The disease reaehed its eulmination in the years 1816-1819. During the great Irish epidemie of these years it is reported that there were no less than 700,000 eases among the 6,000,000 inhabitants.

It may not be inappropriate to reeall that during the last world war over 150,000 people in Serbia died of typhus in less than six months. In Russia it has been reliably ealeulated that from 1917 to 1921 there were more than twenty-five million eases of typhus in the territories eontrolled by the Soviet Republic, with from two and a half to three million deaths.

It is heartening to reeord that typhus is now practieally extinet in Ireland. So mueh so, that the majority of my generation, ineluding myself, have never seen a genuine ease. Things have indeed ehanged for the better as we must realise from the pieture presented by the following appeal written in 1846 by a citizen of Cork to the Duke of Wellington.

" To His Graee
" Field-Marshall, The Duke of Wellington.

"My Lord Duke,

"Without apology or preface, I presume so far to trespass on Your Grace as to state to you, and, by the use of Your illustrious name, to present to the British Public, the following statement of what I have myself seen within the last three days -

"Having been for many years intimately connected with the western portion of the County of Cork, and possessing some small property there, I thought it right, personally, to investigate the truth of several lamentable accounts which had reached me of the appalling state of misery to which that part of the country was reduced. I accordingly went on the 15th instant to Skibbereen, and to give the instance of one townland which I visited, as an example of the state of the entire coast district, I shall state simply what I saw there. It is situated on the eastern side of Castlehaven Harbour, and is named South Reen, in the Parish of Myross. Being aware that I should have to witness scenes of frightful hunger, I provided myself with as much bread as five men could carry, and on reaching the spot. I was surprised to find the wretched hamlet deserted. I entered some of the hovels to ascertain the cause, and the scenes that presented themselves were such as no tongue or pen can convey the slightest idea of. In the first, six famished and ghastly skeletons, to all appearance dead, were huddled in a corner on some filthy straw, their sole covering what seemed to be a ragged horse cloth and their wretched legs hanging about, naked above the knees. I approached in horror, and found by a low moaning they were alive, they were in fever—four children, a woman, and what once had been a man. It is impossible to go through the details, suffice it to say, that in a few minutes I was surrounded by at least 200 of such phantoms, such frightful spectres as no words can describe. By far the greater number were delirious, either from famine or from fever. Their demoniac yells are still ringing in my ears, and their horrible images are fixed upon my brain. My heart sickens at the recital, but I must go on. In another case—decency would forbid what follows, but it must be told—my clothes were nearly torn off in my endeavours to escape from the throng of pestilence around, when my neckcloth was seized from behind by a grip which compelled me to turn. I found myself grasped by a woman with an infant, just born, in her arms, and the remains of a filthy sack across her loins—the sole covering of herself and babe. The same morning the police opened a house on the adjoining lands, which was observed shut for many days, and two frozen corpses were found lying upon the mud floor half-devoured by the rats.

"A mother, herself in fever, was seen the same day to drag out the corpse of her child, a girl about twelve, perfectly naked, and leave it half-covered with stones. In another house, within 500

yards of the cavalry station at Skibbereen, the dispensary doctor found seven wretches lying, unable to move, under the same cloak—one had been dead many hours, but the others were unable to move either themselves or the corpse. To what purpose should I multiply such cases ? If these be not sufficient, neither would they hear who have the power to send relief and do not, even ' though one came from the dead ' . . . . . "

Typhus in South-Eastern Europe.

During the decade which ended in 1931 louse-borne typhus virtually disappeared from Western Europe, the Baltic countries (Esthonia, Latvia and Lithuania), and the countries of the Danube basin, where the disease appeared in epidemic form in the years immediately following the last war and remained more or less endemic for several years afterwards. Since 1931, recrudescences were encountered in Poland, Rumania, and the U.S.S.R. due in part to the effect of prolonged economic depression in the rural areas and to the decreasing proportion of the population which was immunised by the post-war series of epidemics. During 1938 the principal endemic centres were the north-eastern departments of Poland, Eastern Roumania, and the south-eastern districts of Yugoslavia, while small outbreaks were observed in the five western departments of Poland, in Slovakia, in Hungary and the two north-easterly departments, in Bulgaria, and Latvia. In Poland the maximal seasonal increase appeared later in 1939 than in the previous year, the same departments in the north-east were affected, but an increase compared with 1938 was encountered in the departments of Lwow, Wolhynia and Kielce. In Rumania the disease was mainly centred in Bessarabia, and was less prevalent than in 1938. The Drina banovine of Yugoslavia was the principal epidemic centre in 1938, while in Vrbas, Zeta and the coastal banovine a decline was recorded.

Africa.

In North Africa an increase of typhus fever was recorded in Tunisia early in 1939, where for the four-week period ended April 23rd, the number rose from 694 to 780, compared with 428 cases in the corresponding period of 1937, when an epidemic was in progress. In Algeria, the seasonal maximum was reached during the second half of March (139 cases). In Egypt typhus fever was more prevalent in March and April than in any of the previous four years but did not reach the level of 1934. In the four-week period ended April 15th notifications rose from 638 to 891.

U.S.A.

In the U.S.A. there has been in recent years an increase in the incidence of mild flea-borne typhus in rural areas : the total number of cases reported rose from 1,287 in 1935 to 2,299 in 1937 and fell

slightly in 1938 to 2,141. The decline was observed in the two States most affected—namely Georgia and Alabama—but in certain other States the disease showed a slight increase—namely, Texas, North and South Carolina, California and Louisiana. The case fatality of the disease was low—less than 5 per cent. No instance of epidemic louse-borne typhus has been recorded for a number of years. In Mexico the disease is becoming less prevalent ; in 1937, 991 cases were recorded, compared with 1,105 in 1936 and 1,458 in 1935. The case fatality was 28.5 per cent. in 1937 and 27.4 per cent. in 1938.

Australia.

The mysterious "Q" fever of the Queensland coast in Australia has recently been proved to be due to a Rickettsia-like virus. The fever, which is not fatal as a rule, differs from the typhus group in the absence of the characteristic rash and, especially, in the consistently negative response to the Weil-Felix test with different strains of " B. proteus."

THE LOUSE.

The lice which occur on human beings are divided into two genera (Pediculus and Phthirus) : in each genus there is only one species attacking man, viz. " Pediculus humanus" and " Phthirus pubis." The first of these exists in two forms, the head louse and the body louse. The anatomical distinctions between these two are rather indefinite. " Phthirus pubis " is the crab louse, usually found in the inguinal region. The popular name ' crab louse ' is derived from its superficial resemblance to the crab. These lice (both " Pediculus humanus" and "Phthirus pubis") occur only on man, and not on other hosts. They form part of a large family, the Anoplura or sucking lice, which spend their whole life on the skin of a mammal and live exclusively on blood. Some 200 to 220 species of sucking lice are known. Though all the hosts are mammals there are certain important groups which have no parasites of this type ; for instance the Carnivora (exclusive of the dog family) and the Marsupials. No human race, (so far as is known), is without lice or immune to them.

It is found that the head louse and body louse frequently occupy the same territory and that they have every opportunity of interbreeding. Hybrids artificially reared in the laboratory have been found to be fertile.

The egg laid by the louse is popularly known as a "nit." Lice may pair during the first ten hours of adult life, and if they are kept together for the first two days it is nearly always found that the female is fertile. If the sexes are separated after pairing, the female will lay fertile eggs for a variable period up to 20 days.

When the female is about to deposit an egg she grasps a hair (or fibre of a garment) between her claspers. The egg then issues from her body, the pointed end coming first. At this moment there is a flow of cement from certain body glands. This cement covers the pointed end of the egg and the shaft of the hair, but ceases to flow before the broad end of the egg (which has a cap for the emergence of the embryo) has left the female's body. The eggs are orientated along the axis of the hair or fibre. Eggs are generally attached close to the base of the hair, and the part of the scalp most commonly chosen is that behind the ears. Eggs are frequently laid inside hats. The body louse most generally lays its eggs on the inner surface of the undergarments, but quite commonly on hairs growing on the body. In the absence of any garment, the body louse will infest beads and necklaces. After the egg of the head or body louse has hatched, the empty shell may remain stuck to the hair for long periods, and eventually be carried away from the skin by growth of the hair. It is important not to accept such empty shells as evidence of present infestation.

Parthenogenesis (the laying of fertile eggs by virgin females) does **not** occur. Many investigators using different strains of lice have isolated large larvae and kept the virgin females till death. Many eggs are laid, but they are **invariably sterile.**

A female body louse in nature will lay about 10 eggs per day, with a total production of 200-300. It is calculated that lice live, on an average, for about one month, when they die of old age or accident. When the larva has emerged from the egg, it moults three times before attaining adult stature, which takes about 9 days.

Many factors influence the distribution of the head louse among a population of human beings. It is known, for instance, that for many parts of the world, children are more infested than adults, or young males more than grown men. In many places girls and women are more frequently and heavily infested than boys or men. In general, most of the differences may be attributed to local standards of cleanliness, care of the hair, cosmetics, etc.

There is, besides, a personal factor. Some people react much less than others to the bite of the " Pediculus," a fact which makes them careless. It should also be remembered that destitution, disabling illness, weak-mindedness, illness in the aged and feeble will tend to allow of easy infestation, whereas qualities of vanity and self-respect in normal vigorous people would have the opposite effect.

The general abundance of the louse in human communities differs enormously in different parts of the world. There is a general

tendency for these insects to be widely distributed among the poorer sections of the community, and among those whose hygienic standard is lowest. As the appreciation of hygiene becomes more widespread, these parasites tend to disappear from their human hosts owing to individual effort, even if no widespread organised measures are employed. Thickening and pigmentation of the skin, the so-called "vagabond's disease" may apparently follow from long-continued infestation. It is stated that in the Andes people crush lice with their teeth and may acquire a plague infection of the tonsils. The control of the louse brings an epidemic of typhus rapidly to an end. Unfortunately, in many parts of the world there is a pernicious belief that lice are evidence of robust health, and of fertility in females. Superstitions of this sort have helped these ubiquitous parasites to maintain their loathsome grip on mankind owing to the indifference and even tolerance with which the credulous, as a consequence, regard these dangerous vectors of disease.

On the assumption that the average female louse lived only twenty days, that she laid only six eggs a day, and that 80 per cent. of her offspring died without reproducing themselves, the descendants of a single female even then would amount to 1,000 viable females on the eighty-ninth day.

Actually, counts on the hair or on the shirt demonstrated that with both head and body lice small populations of from one to ten lice were commonest, and that counts beyond 100 were rare. This suggested that populations frequently started were exterminated, or that they were kept at a low level by human interference, or by some other factor which was effective when the population was less than 100.

Control of Head Louse.

(1) Shaving the scalp tends to reduce infestation, but it must be remembered that the eggs are laid close to the scalp, and therefore this method is not sufficient. It facilitates the application of more powerful remedies, however.

(2) Ordinary paraffin or kerosene (as burned in lamps) will kill the insects and their eggs, but may irritate the skin.

If it is diluted with an equal quantity of olive oil, paraffin oil remains efficient and is much less irritating. Very thorough combing is necessary after application. One could increase the efficiency of the above preparation by substituting petrol for some of the paraffin. The liquid is rubbed well in and the head covered with a towel for several hours. Great care must be taken to perform the operation

where there is no open flame, and to refrain from the common practice of drying the hair at the fire as is usually done when the hair is washed.

(3) Mr. R. Mellanby finds that one can kill head lice and eggs with either 70 per cent. Alcohol or a mixture of 7 parts methylated spirit with 3 parts of water. Not more than 3 fluid ounces is required for a child's head ; for a boy with short hair 1½ fluid ounces is ample. The liquid is either poured over the head taking care to wet the hair behind the ears and at the back of the neck, or else the head is covered with lint previously dipped in 70 per cent. spirit. The low surface tension of the mixture ensures its penetration to the roots of the hair so that all nits are wetted. A rubber cap is put over the wet head for about an hour. After its removal the hair dries in a few minutes, and need not be washed.

Spirit in this dilution is not readily inflammable and does not harm the scalp, though it may produce a slight tingling sensation, particularly in a head made sore by scratching. **It must be kept out of the eyes.** This method is both simple and cheap, and no one need know that the child has been treated.

(4) Xylene (Xylol) is valuable, though irritating to the skin. An ointment containing 25 per cent. commercial xylol in vaseline and lanoline has been recommended. It must be well rubbed in to all hairy parts. 25 per cent. petrol in vaseline is also used. The risk of fire in both these methods is evident.

(5) 2 per cent. cresol or lysol (i.e. crude carbolic acid emulsified with soft soap) is efficient if applied for 20 minutes : it may be irritating if left on the scalp for long. Phenol (Carbolic acid) diluted in 1:40 in water is also recommended. The patient lies on the back with the head over the edge of a table, and the liquid is poured through the hair, caught in a basin, and poured through again until the hair is all saturated. It is then lightly squeezed and tied up in a towel for 1—2 hours. The treatment kills eggs as well as lice (Whitfield, 1921).

(6) For the last twenty years certain German cities have used sulphur dioxide. The scalp is covered with a tightly-fitting rubber cap provided with inlet and outlet pipes through which the gas (4 per cent. by vol.) is passed. After 12—15 minutes the gas is sucked out, and all the lice and eggs are dead. The gas has also a curative effect on the eczema so often caused by head lice. One of the simplest and most convenient ways of destroying head lice is very thorough combing with a specially fine metal comb such as that made by Messrs. Sacker : the teeth must be so close together that the lice cannot slip through them and that the eggs or nits are crushed as

the comb is pulled through the hair. Success depends on careful, thorough work. In treating an infested head, do not forget to sterilise the hat.

Control of Body Louse.

It sometimes happens that a single individual becomes accidentally infested with the body louse. It may be sufficient for him to shave the hair of the body as far as possible, washing all over, and applying xylene or 2 per cent. cresol, soaking the underclothes in the same fluid, and treating the outer garments, particularly the seams, with a hot iron.

The vapour of naphthalene is fatal to lice (even in the concentration prevailing under the clothes), and the effect is lasting as the substance is not very volatile. A common preparation is N C I powder (Naphthalene 96 parts, creosote 2, iodoform 2). It is more lethal than naphthalene, but rather moist to apply: 2 oz. per man should be rubbed into the shirt and undergarments. It is, of course, useless to provide a change of underclothing if the outer garments cannot be treated at the same time (cf. bedclothes). In delousing stations, garments are raised to a temperature (by means of hot air) of 60 degrees C. (140 degrees F.) for 10 minutes. This heat suffices to kill all lice and nits.

Lice on floors and walls could be dealt with by spraying with an emulsion of kerosene in soap and water. Formaldehyde is of little use as an insecticide and should not be used either as gas or as a watery solution ("formalin"). **It may be assumed that if garments are stored for a month all lice and eggs will be dead.** Lice are rare in summer owing to the fact that people are lightly clad. In autumn and winter people put on heavier garments in which lice become abundant. Owing to this seasonal increase in lice, there has arisen a popular misconception that they are derived from garments which have been put away for the winter.

SCARLET FEVER.

This disease was rather prevalent again this year, with a total of 96 cases notified, and two deaths. As mentioned in previous reports, the cases notified form only a fraction of the total incidence, largely due to the mild manifestations of the disease in recent years. Many cases suffer only from a mild sore throat, the true nature of the affection being manifested by its epidemic incidence, and subsequent peeling of the skin. The doctor is usually not called in these cases, and therefore they are not notified.

The important relevant findings in regard to this disease are recorded in last year's report. Suffice it to repeat: "Apart from

occasional milk-borne spread, the bulk of streptococeal disease is **spread by droplet** (speaking, coughing, laughing, etc.). This common type of droplet spread has eertain peculiarities. (*a*) It is a community disease. Spread within the home, school or other institution aceounts for the greater part of the contagion. Casual contacts in street, vehicles, shops, or from visiting relatives in hospital, are relatively of minor importance. (*b*) The bulk of immune carriers are themselves infected for a short period of time only. Their role in epidemics is most important."

DIPHTHERIA.

The total number of eases of Diphtheria for County Donegal in 1939 was 55. Of this number, eleven had been immunised (by what is now known to have been an insufficient amount of A.P.T.). The eleven cases occurring in immunised ehildren were all of a mild character, **and no deaths took place.** Among the 44 eases who had **not** been immunised, there were 5 deaths.

It is satisfactory, therefore, to be able to record that even immunisation of a nature now recognised not to be complete was sufficient in all cases to prevent death from the disease. Unhappily among those who had not been immunised diphtheria exacted its usual dread mortality (11.4 per cent.).

The subject of active immunisation is discussed further in the report on the Schools.

INFLUENZA.

Eighty-six deaths were returned as due to influenza in County Donegal in 1939. Deaths attributed to influenza are generally due to complications arising in heart or lungs, and not to the disease itself. Influenza, if uncomplicated, produces a short sharp illness from which recovery is usually rapid. In severe and fatal cases the intervention of some organism has been demonstrated. This invasion has doubtless been facilitated by a lowering of resistance produced by the influenza virus. The occurrenee of pneumonia or other respiratory disease is one of the commonest effects of such an invasion, particularly in autumn and spring. Respiratory complications are recorded in some 70 per cent. of fatal illnesses classified as influenza.

Means by which Infection takes place.

Infection is conveyed from the sick to the healthy by the seeretions of the respiratory surfaces. In eoughing, sneezing, and even

in loud talking these are transmitted through the air in the form of a fine spray. There is a special danger of receiving a massive infection from a person talking loudly within 4 feet, or coughing or sneezing, without the interposition of a screen, within 10 feet. The channels of reception are normally the nose and throat, and there is evidence that infection can be received through the eyes. Only a brief exposure appears to be necessary to contract the infection.

Infection can also be carried to the mouth by hands which have been soiled by secretions from the nose or throat of an infected person, for example by a soiled pocket handkerchief. It appears that in everyday life, intense temporary overcrowding in buses, trains, omnibuses, and places of entertainment is a more important factor in the spread of influenza than is overcrowding in the home.

Measures of personal protection.

Ventilation—Well ventilated airy rooms promote physical well-being, and fresh air dilutes and dissipates infective material.

Gargles—Gargling has been recommended as a preventive measure though its importance has been over-rated. It may be employed with advantage after exposure to infection in a crowd or close contact with an infected person.

Face-Masks—The public are not advised to make use of face-masks. By hindering the free circulation of air through the nasal passages they cause congestion of the mucous membrane and thus may induce greater liability to attack. Temporary use of surgical masks by those attending on the sick may, however, be occasionally desirable.

Vaccines—There is no direct evidence, so far, that vaccines protect against the disease.

Protection by Drugs—No drug has been proved to have any specific influence in the prevention of influenza.

Needless Exposure—It is evident that during influenza prevalence, the risks of contracting the disease may be diminished appreciably by abstaining, wherever possible, from attendance at social or other gatherings at which a large number of persons are to be present.

Precautions when attacked.

At the first feeling of illness the patient **should go to bed in a room by himself, keep warm and seek medical treatment.** The

doctor, if called immediately, is afforded the opportunity of giving advice or treatment which may ward off the more dangerous complications. Relapses and complications are much less likely to occur if the patient goes to bed at once and remains there for two or three days after his temperature is normal; much harm may be done by getting up too early.

The secretions of the patient are most infectious in the early stages, but isolation should be maintained until the temperature has been normal for 24 hours.

The liability of nurses to infection may be diminished by adequate ventilation of the patient's bedroom, and by avoiding inhalation of his breath, particularly when he is coughing, sneezing or talking. The risk of conveyance of infection by the fingers must be constantly guarded against, and the hands should be washed at once after contact with the patient or his secretions.

The virus of influenza is easily destroyed, and extensive measures of disinfection are not called for. The spit should be received in a suitable receptacle in which is a solution of chloride of lime or other disinfectant. Discarded handkerchiefs should be immediately placed in disinfectant or, if paper or rag, burnt.

The patient should be fully recovered before returning to work.

Disinfection.

The routine disinfection of premises and articles after use by influenza patients is not called for, but a thorough washing and cleansing of rooms and their contents, and of washable articles, bedding or apparel is desirable. The practice of spraying halls and places of public resort with a disinfectant fluid is of doubtful utility.

PINK DISEASE (A Disease of Childhood and Infancy).

Pink Disease is a rare disease, although within recent years fairly widespread epidemics have occurred from time to time first in Australia and later in other countries. The malady is probably of infectious origin, attacking the vegetative nervous system and producing very definite and distinct disturbances of function.

Owing to its comparative rarity the infection is apt to be undiagnosed or treated as some other condition, and therefore the rather characteristic signs and symptoms deserve to be placed on record. Actually five definite cases have come under my notice in County Donegal since October, 1938. The first two cases were

described by me in "The Irish Journal of Medical Science," May, 1939. Following on that, it was considered advisable to circularise all the Public Health Nurses and local Medical Officers of Health, giving a short summary of the outstanding signs and symptoms.

The following is a copy of the circular. Three of the five cases were notified by nurses as a result of reading the short description contained therein :—

Public Health Department,
Stranorlar, Co. Donegal.
17th February, 1939.

A Chara,

I should feel greatly obliged for particulars of any children you may have come across suffering from symptoms resembling those set out below. I have already come across two cases in Stranorlar area.

PINK DISEASE (A disease of childhood and Infancy.)

Onset rather indefinite. Sometimes slight febrile disturbance and running from nose. At first the child appears restless and rather miserable. Previously happy and contented it passes into a state of fretfulness which suggests teething or some other discomfort. After some time the child is very much changed and will not smile, laugh or take any interest in its toys. Loss of appetite with marked loss of weight may occur, and the child cannot sleep. Muscles become very flabby and hypotonic. Photophobia is sometimes present in the early stages. Glands enlarged.

After a few weeks the disease shows the classical phase of a very miserable child, due to constant painful itching of the skin. Four main sites are affected—hands, feet, circumoral area and the anal area. Younger children keep rubbing and sucking their hands and feet constantly, and may hold them up to be rubbed by the parents. The hands and feet often become pink, swollen and sodden from constant sweating, and later the skin may crack and begin to peel in these areas. The nose and cheeks may also become pink. Rashes on the body and extremities are common. Usually the patient loses the power of walking, and sometimes of speech. Constipation is common. Hair and teeth may fall out, and septic processes may start on the body or scalp. The pulse is usually rapid. When the child does fall asleep it generally does so in a characteristic attitude with the face pressed into the pillow.

These symptoms may last for a few months, and then the child gradually begins to return to normal. The stage of recovery is often heralded by a smile. The child now begins to manifest some interest

in his toys, and slowly recovers his strength and vigour. The disease usually lasts from four to six months, but may take twelve months or more.

Sometimes retention of urine and rectal prolapse may occur.

To recapitulate, the following are the outstanding symptoms :—

(1) Long duration of illness with rather indefinite onset. Child often appears prostrated.

(2) Marked sweating, with painful and constant itching of hands and feet.

(3) Sleeplessness.

(4) Change in charaeter ; baby becomes sad, irritable, and very miserable.

(5) Constipation common.

(6) Loss of appetite marked (usually).

(7) Museles become flabby and wasted—movements of limbs may be slow.

(8) Loss of weight—legs often become very thin.

(9) Glands usually enlarged.

(10) Pulse may be very rapid.

(11) Parents often suspeet tuberculosis or rickets.

Is mise, le meas,

M. S. BASTABAL,

County Medieal Officer.

To—Each Medical Practitioner,
District Nurse, and Midwife,
in County Donegal.

Treatment.

No speeifie treatment has hitherto been available for this distressing and sometimes fatal malady of childhood. However, rather

striking results have recently been reported from intra-muscular injection of vitamin B in two cases reported in a medical journal. If these results are corroborated, it would appear that the course of the illness may be considerably curtailed and the patient restored to health within a period of some six weeks.

DISINFECTION.

(See "Rural Health Practice"—Mustard).

The following instructions are designed to be of practical benefit to householders nursing a case of infectious illness.

Household Directions in cases of communicable diseases.

Don't take chances !

A communicable disease is one that may be spread to others. In order to catch one of these diseases one must take into his body the germs from the sick or infected person. The germs are given off from the body in the nose and throat secretions or in discharges from the bowels or bladder. They are taken into the mouth or nose by soiled fingers, or into the stomach by swallowing contaminated food, milk or water.

With the occurrence of a communicable disease in your home, you have three responsibilities : (1) The care of the sick, (2) the prevention of the spread of the disease to other members of the family, and (3) the prevention of the spread of the disease to the public.

To prevent the spread of the disease the following things are necessary.

1. Separate the sick from the healthy. Put the patient in a separate room. If possible, choose a sunny, well ventilated room from which rugs and heavy curtains have been removed. Allow no one to enter the room except the person nursing the sick. It is best that the patient be the only one to sleep in the room. If necessary for person nursing to sleep in room, a separate cot should be occupied. Keep separate dishes for the sick, and wash them in the room. Burn or disinfect all food not eaten. The room should be screened.

2. Disinfect or burn all discharges. Discharges from the nose and mouth should be caught in old rag or paper napkins and burned. Bowel and bladder discharges should be disinfected with

chloride of lime allowed to stand for at least one hour, and should then be buried in a trench prepared for this purpose. The amount of chloride of lime to be used should be twice the amount of material to be disinfected. Mix well.

3. Disinfect the room every day. We used to **think** that a bad-smelling fumigation on the last day of the disease would work magic. Like most "magic," it did not work and we have ceased to rely on fumigation. Now we **know** that the patient gives off poison each day, and that, in addition to disinfecting the discharges, the wood work, the floor around the bed, the furniture, door knobs and everything touched by the person nursing should be wiped off every morning with a disinfectant solution. Do not forget that sunshine and fresh air coming through open windows are wonderful helps in disinfection. Send nothing to the laundry unless boiled or disinfected and only then with the Health Department's permission.

4. The person nursing the sick. It is highly dangerous for the person nursing to handle food for anyone else. She should not cook, milk or wait on the table. She should leave the sick room only if necessary, and then only after thoroughly scrubbing and disinfecting the hands. While in the sick room an over-all apron should be worn. This should be removed when leaving the room.

5. Other members of the family. When the disease is diphtheria, typhoid fever, or smallpox, other members of the family should be given protective injections or vaccinated. They must keep away from the sick. If the sick room is not screened, have the men or the boys in the family do this. The men folk should immediately make the toilet sanitary.

6. At the end of the quarantine. Have a general house cleaning, with special attention to the patient's room. Use plenty of elbow grease, soap, water, sunshine, fresh air and disinfectant solution. Let mattress, quilts, etc., sun out-doors for two days. Boil other bed clothes. The patient and nurse should have a thorough bath. Wash the hair: give complete change of clothes. Sun and air or disinfect the clothes worn during quarantine.

7. How to mix disinfectants. Chlorinated Lime: Add 6 heaping tablespoonfuls to a gallon of water. Keep jug of this in sick room. Make fresh solution every two or three days. **Use:** for discharge of bowels and kidneys. Cover material to be disinfected. Allow to stand for one hour, then bury. **Lysol** (or other disinfectant of similar strength): Add one (1) tablespoonful to a basin of water. Make as needed. **Use:** for disinfecting furniture, etc., and for hands after thorough washing. Hold hands down in the mixture for 2 minutes.

HOUSING.

The following table shows for each county (urban and rural areas) and each county borough the number of new houses completed by local authorities, private persons and public utility societies under the Housing Acts (1932-39) to January 31st, 1940.

	NEW HOUSES COMPLETED.		
	Local Authorities		Private Persons and Public Utility Societies (Urban and Rural Areas).
	Urban Areas	Rural Areas	
Carlow	294	663	97
Cavan	158	277	493
Clare	298	454	780
Cork (excluding Co. Borough)	674	999	2,147
Donegal	198	430	605
Dublin (excluding Co. Borough)	700	1,006	2,909
Galway	695	536	2,275
Kerry	581	170	2,263
Kildare	356	755	227
Kilkenny	362	629	141
Laoighis	187	492	158
Leitrim	—	190	386
Limerick (excluding Co. Borough)	52	1,021	752
Longford	70	358	130
Louth	1,471	513	488
Mayo	668	196	2,759
Meath	305	1,073	157
Monaghan	345	191	867
Offaly	388	587	268
Roscommon	58	342	898
Sligo	424	308	793
Tipperary N.R.	498	779	185
Tipperary S.R.	871	851	173
Waterford (excluding Co. Borough)	229	483	148
Westmeath	472	451	260
Wexford	798	1,172	341
Wicklow	697	1,235	285
Co. Boroughs :—			
Cork	1,354	—	524
Dublin	8,745	—	6,716
Limerick	822	—	385
Waterford	662	—	59
TOTALS	23,432	16,161	28,663

NUMBER OF PERSONS OF EACH RELIGION IN THE COUNTIES OF ULSTER (PART OF) :

County	Total Persons	Catholics	Episcopalians	Presbyterians	Methodists	Jews	Baptists	Others
Cavan	76,670	65,520	8,644	1,892	387	—	3	224
Donegal	142.310	118,906	11,516	10,445	1,042	14	8	379
Monaghan	61,289	49,715	5,206	5,872	209	3	25	259

LETTERKENNY.

The following particulars were kindly supplied by Mr. Cannon, Town Clerk :

The Letterkenny Urban District Council had acquired some thirteen acres of land compulsorily for erection of 174 houses (reports in the local press mentioned a scheme of 60 houses ; the Council at no time had such a scheme in view) by the end of 1937, at which time lay-out plans were first submitted for approval of the Minister for Local Government. New plans were submitted in 1938, and a deputation consisting of Chairman (Mr. M. Moriarty), Town Clerk (Mr. G. Cannon) and Town Surveyor (Mr. C. V. McLaughlin) visited the Department in December, 1938, to press for sanction to the inclusion of 5-roomed and 6-roomed houses in the scheme.

The general housing survey of 1938 had not yet been carried out, and the Local Government Department insisted on its completion in order that a firm estimate would be available of houses required. The Survey was carried out by the Medical Officer of Health (Dr. J. P. McGinley) and the Town Surveyor (Mr. C. V. McLaughlin) and was completed in August, 1939.

A copy of the Town Clerk's report and estimate furnished to the Local Government Department on the survey is attached. It will be noted that the estimate of the number of houses required agrees with that given in the County Medical Officer of Health's report for 1938.

A letter received in December, 1939, from the Local Government Department was submitted to the Council stating that the Minister was not prepared to approve erection of six-roomed houses at a cost

of £879 or of five-roomed houses at £679, but would be prepared to consider a proposal to proceed with a scheme of four-roomed houses to accommodate the 89 families shown in the recent survey as living in unfit houses.

The Council's scheme for 89 four-roomed houses is at present being prepared.

Housing Survey, 1938.

Particulars concerning dwelling-houses occupied, or of a type suitable for occupation, by persons of the working classes :—

1.	No. of dwelling-houses provided for one family now used, without being specially adapted, for two or more families	47
2. (*a*)	No. of dwelling-houses with more than two occupants per room (omitting infants under one year)	23
(*b*)	No. of persons inhabiting such dwellings	217
3. (*a*)	No. of dwelling-houses which are unfit for human habitation and which cannot be made fit at a reasonable expense.	77
(*b*)	No. of persons inhabiting such houses	317
4. (*a*)	No. of dwelling-houses which are unfit for human habitation but which could be made fit at a reasonable expense.	91
(*b*)	No. of persons occupying such houses	483

G. CANNON,
Town Clerk.

Dated : 31st August, 1939.

Housing Survey, 1938.

Estimate of requirements to meet needs of period ending 31st March, 1944.

To meet unsatisfied demand	92
To rehouse persons displaced by clearance of unhealthy areas	3
To replace other unfit houses	86

To meet anticipated deficiency arising from industrial development.	20
Total number of houses required	201

G. CANNON,
Town Clerk.

Dated : 31st August, 1939.

BUNDORAN.

The Town Clerk, Mr. B. Brady, informs me that 62 new houses have been provided by the Council since the introduction of the new Housing Acts. No additional houses were built during 1939, but it is hoped to provide some further needed housing accommodation in the coming year.

BUNCRANA.

No housing activities during the year.

COUNTY HEALTH AREA.

I am indebted to the Secretary of the Donegal County Board of Health and Public Assistance for the following statement re Labourers' Cottages :—

(1) 32 cottages were completed during the year.

(2) 17 cottages were in course of erection at the end of December, 1939.

(3) A Public Local Inquiry was held during the year 1938 as to the propriety of confirming the Compulsory Purchase Order made by the Board for the acquisition of sites for 507 cottages, but, up to the end of the year 1939, the result of that Inquiry had not been announced.

HOUSING (Inspection of Districts) REGULATIONS, 1936.

These have been complied with in the Urban Districts. No reports have been received from the rural districts so far.

TOWN SANITATION.

The ambitious water scheme known as the **Rosses Regional**

Water Supply, which was commenced in 1938, has been partly completed. As explained last year this scheme was designed to supply a scattered rural population in a district where proper well-water was notoriously difficult to find, and the influx of summer visitors created an annual problem of some magnitude.

The source of the new supply is Lough Kee., some two miles south of Crolly Bridge. A water main has now been laid from this lough to Crolly Bridge, where two main branches are made, one going to Bunbeg and the other to Annagry, with a sub-branch to Ranafast. The scheme is now working satisfactorily in these areas. The extension from Derrybeg to Kincasslagh was started in November, 1939, and is now well on the way to completion.

The following report has been kindly supplied by Mr. W. J. Doherty, M.R.I.A.I., 12 Castle Street, Derry :

The first three sections of the **Rosses Regional Water Scheme** were completed during 1939. These comprise the areas from Lough Keel to Crolly, Crolly to Annagry with a branch to Ranafast peninsula, and a line from Crolly to Bunbeg, covering in all ten miles of pipe-line, and including enclosed filters and a service reservoir. The scheme was formally inaugurated and the water turned on by An Tanaiste in July.

Since that month, preparations were made for undertaking Sections 4 and 5. Thanks in a large measure to the financial help extended by the Ministry, the Board found it practicable to accept a tender at £9,932 1s. 0d. for these further portions of the regional scheme. The work was commenced in October, 1939, and it has been progressing steadily. When completed, the pipe-lines will cover the ground from Annagry to Kincasslagh on the one side and from Bunbeg to Derrybeg on the other, an addition of six miles to the pipe-lines already laid, and constituting in all sixteen miles of pipe.

The **Lough Salt Water Scheme,** which is to serve part of the County Area and the Urban Area of Letterkenny, was dealt with during this year. After negotiations between the public bodies interested in its promotion had advanced sufficiently far, the Board had Plans and Specifications prepared, tenders taken, and in December a tender was accepted at £20,982 8s. 10d. The preliminaries in connection with the starting of the work were placed in hands, and the scheme is expected to be finished in the coming year. Some doubt was felt as to whether supplies of steel and iron pipes could be obtained for this scheme and the Rosses Regional scheme, but it is satisfactory to be able to state that these difficulties were surmounted. Deliveries of all materials required for the Rosses scheme were received

very soon after the War broke out, and in regard to the Lough Salt scheme, assurances in regard to delivery leave no doubt but that the materials will be duly forthcoming. The scheme provides for the supply of the Mental Hospital ; of Kilmacrenan, and of the Urban Area of Letterkenny, with a margin for the proposed new County Hospital.

Fahan Water Supply was commenced and duly completed within the specified time, at a cost of £3,071 5s. 3d. The source is a group of springs. These are collected and conveyed to a service reservoir, and piped along the road in service mains. The water was formally turned on by Captain J. Scott, County Councillor, in July, and the extent to which its benefits have been appreciated by householders in the district is shown in the high proportion of connections which have been made to the mains.

In the minor water-works, a further well was sunk and completed at **Porthall.**

Several other water schemes, although not actually started, were further advanced. For various sound reasons much care must be taken in the initial stages of the promotion of a water scheme. Gaugings and tests in many schemes have been recorded, and these necessary particulars are now available when required.

In **Ballyshannon, the South Side Sewage Scheme** was completed, including the installation of the sewage lift which raises the outfall from the South side to such a level that it discharges by gravity on the North side of the River Erne.

LETTERKENNY.

The following particulars have been kindly supplied by Mr. C. McLaughlin, Town Surveyor :

An extension to the Sewerage Scheme has been completed at a cost of £1,961 0s. 0d.

Another Sewerage Scheme is contemplated, and all the documents are with the Department for sanction.

The Department have sanctioned the erection of 90 houses, and plans for these are also with the Department for sanction, and it is hoped that tenders will be invited within the next month or so.

During the year several sites were visited for the proposed Abattoir.

Plans are with the Urban Council for an Underground Lavatory in the Market Square, for both sexes.

The Relief Grant of £1,600 has almost been spent in raising stones for road metal, making concrete footpaths, and re-metalling side roads. It is the intention of the Urban Council to break the stones and tar the roads when suitable weather arrives in the early spring.

SLAUGHTER OF ANIMALS ACT, 1935.

The principal points in this Act were summarised in the 1937 annual report. As stated therein, the object of the Act is to provide for the proper treatment of animals in slaughter-houses, the humane slaughter of such animals by approved instruments, and the licensing by the Sanitary Authority of the persons using such instruments.

The Board of Health have, likewise, power to make bye-laws for :—

(*a*) securing the decent and seemly conveyance of meat through public thoroughfares,

(*b*) the inspection of meat to be sold for public consumption, and

(*c*) prohibiting the sale for human consumption of meat which has not been inspected in accordance with such bye-laws.

This matter of bye-laws is in abeyance for the moment, pending the framing of model bye-laws by the central authority. The Act has been adopted, however, by the Donegal Board of Health and Public Assistance, and all slaughtermen have now to be licensed, and their premises are open to reasonable inspection.

It is hoped that the working of this Act will do much to improve the quality of meat prepared for human consumption.

MEAT INSPECTION.

As regards meat inspection generally, there are five Veterinary Inspectors in the County who inspect carcases in slaughter-houses at regular intervals. They also attend at fairs and markets and seize any animals suffering from infectious or dangerous diseases.

The following are the five Veterinary Inspectors at present operating in County Donegal :—

Name of Veterinary Inspector	Address.
F. McShane	Donegal.
R. Marner	Carndonagh.
E. O'Hagan	Milford.
P. McGlinchey	Letterkenny.
T. A. McClintock	Dungloe.

TUBERCULOSIS.

Clinics for the diagnosis, treatment and prevention of tuberculosis are held as follows :—

Each fortnight—At Letterkenny, Carndonagh, Donegal and Glenties.

Each month—At Dunkineely, Carrick, Ardara, Dungloe, Pettigo, Ballyshannon, Milford, Tamney, Carrigart, Buncrana, Clonmany, Muff, Moville, Stranorlar, Raphoe, Lifford, Dunfanaghy, Falcarragh, Bunbeg, and Frosses.

Arranmore Island is visited as required by the local Medical Officer. In addition, suspected cases are visited in their own homes at the request of their own doctor, or of any other responsible person interested, provided the dispensary doctor is agreeable.

ATTENDANCE AT CLINICS.

January	218	February	210
March	228	April	241
May	219	June	204
July	192	August	188
September	210	October	210
November	177	December	211

The examination of contacts is urged on all our patients, and in most cases they respond readily. Those contacts who are found

to exhibit any clinical signs of disease are immediately X-rayed, and if necessary sent away for treatment. All contacts are kept under observation for varying periods of from six months to a year, and are periodically overhauled in order to detect any suspicious signs of disease.

An arrangement has been made by the Board of Health whereby patients from the south of the County may be X-rayed by Dr. Daly in the Sheil Hospital, Ballyshannon, and those from the north by Dr. McGinley in Letterkenny Hospital. Both doctors have been working under this scheme during the year, and have given every satisfaction. They have been very co-operative in regard to convenience of patients, and the standard of their X-ray work has been very good.

The following table gives the annual notifications of all forms of tuberculosis in County Donegal, together with the separate figures for deaths from pulmonary and non-pulmonary forms :

Year	Notifications	DEATHS REGISTERED.		
		Pulmonary	Other Forms	Total
1930	246	151	45	196
1931	150	122	35	157
1932	98	111	43	154
1933	89	120	30	150
1934	91	103	38	141
1935	80	106	36	142
1936	75	107	20	127
1937	59	93	35	128
1938	65	100	34	134
1939	73	101	27	128

The number of deaths from Tuberculosis (all forms) in 1939 was 128, the same number exactly as in 1937, and six less than the figure for 1938. The death-rate per thousand of the population was 0.9.

THE TUBERCULOSIS DISPENSARY.

There has been a movement in England of recent years to abolish the above term and substitute the term "Chest Clinic" or some such equivalent. The movement has arisen largely as a result of the reluctance felt by many people to visit a building associated with a dreaded disease. However, according as the public becomes more and more enlightened as to the benefits of early diagnosis and treatment, this attitude should gradually disappear, and give place to a more rational outlook.

DIAGNOSIS.

It is unnecessary to emphasise the importance and necessity of repeated sputum examinations in all cases of continued cough. By this means cases of "chronic bronchitis" are not infrequently found to be tuberculous, and may obtain suitable treatment.

RADIOLOGY.

Dr. Jessel of Lancashire in a recent paper summarised some of the following points. The importance of X-rays as a means of accurate and speedy diagnosis is now generally recognised. Some local authorities have been laggard in providing these facilities, perhaps because the cost has been deterrent in some cases. This, however, is a short-sighted point of view, because it is notorious that in the past large sums have been expended on the treatment of non-tuberculous conditions in tuberculosis institutions thereby delaying the admission of definite and infectious cases. It has been established beyond question that radiological evidence of pulmonary tuberculosis frequently exists with a complete absence of physical signs in the chest. On the other hand, the interpretation of a chest skiagram is a specialised procedure, and it is frequently impossible to make a diagnosis by means of a skiagram alone.

In children under 15, physical signs and skiagrams have often been misinterpreted, and many non-tuberculous persons have been regarded and treated as tuberculous. On this account the use of the Tuberculin Test is strongly recommended. It is easy, and when negative is valuable, because within certain limitations it gives an assurance of the absence of tuberculous infection.

As illustrating some points in diagnosis, the following case may be of some interest:-

A young male adult aged 26 years reported at his local doctor's dispensary on December 30th, 1938, that he felt unfit for work as he had spent a few days in bed with a cold, and did not yet feel very well.

He was troubled with a slight cough but made no other complaint. He was given a tonic, and on February 8th, 1939, declared himself fit to resume work as a newsboy.

On March 1st, 1939, he went off work again, when he was examined at home by his own doctor.

Complaint. He was feeling out of sorts, and was frightened by a persistent twitching of his left leg.

The doctor found violent twitching of the extensor muscles of the left knee. This ceased in a few hours. The patient was suffering from severe headache which had developed a week previously and felt light in the head. He told his brother that he felt as if he were walking backwards rather than forwards. His temperature was 100 degrees, pulse 90. He was quite normal, apparently, for two further weeks in bed, until he started raving one night. Headache was very severe, and he developed a squint which came and went. His pupils were dilated, he developed rapid, coarse nystagmus and his neck was rigid. He had developed a constant, regular hiccough, and was incontinent.

Owing to the indefinite symptoms at first, with headache and pyrexia, the blood was examined twice at intervals of a week, but was negative for enteric. When symptoms of meningitis appeared a sample of the spinal fluid was taken, and the pathologist reported ; " The results are consistent with either a tuberculous meningitis or encephalitis lethargica. Taking them as a whole they are slightly in favour of encephalitis." As it was considered important to try and rule out the latter epidemic disease, if possible, a further sample of spinal fluid was obtained six hours before death. This final sample showed the presence of tubercle bacilli, and thus clinched the diagnosis.

At first seeming this case was very suggestive of lethargic encephalitis or sleepy sickness, and the report on the spinal fluid tended to confirm this. The case would in all probability have been finally regarded as such, if we had not been fortunate enough to obtain a second sample of the fluid.

I am indebted to Dr. Gallagher of Donegal Hospital for many of the above details, and I wish to record my appreciation of his co-operation in the difficult procedure of obtaining spinal fluid from a rigid and gravely ill patient.

CONTACT EXAMINATION.

The idea that a "march past" of contacts would reveal the stigmata or presence of tuberculous disease as a result of light percussion or other kindred procedure is in my view (Dr. Jessel) a figment of the imagination. The result has been the birth of the misleading word "pre-tuberculous," and the erroneous idea that the fingerprints of previous tubercular toxaemia can be found in the school history of tuberculous persons. We now know, however, that **the tuberculous adolescent is not the delicate child.** The diagnosis of adolescents is of far greater importance, and it is suggested that the examination of all entrants into factories and workshops at the age

of 16 be extended to include offices, shops and indeed all employment ; that examination be systematic and compulsory, that x-rays be available, and that definite contacts of infectious cases be kept under observation and examined at intervals of five years.

AFTER-CARE.

The position of patients after their return home from institutional treatment remains the weakest part of even the best tubercuIosis schemes, and it might well be cheaper for local authorities to set aside money to improve the home conditions of patients and to provide employment according to their fitness and abilities rather than complacently to accept the too frequent necessity for further periods of residential treatment which have little curative value.

EDUCATION.

The spread of hygienic teaching in schools and elsewhere has doubtless led to an improvement in public behaviour. Promiscuous spitting, for example, is now far less prevalent, as people begin more and more to realise the danger to others liable to arise from this insanitary habit. Other hygienic knowledge of a more general nature is slowly but surely percolating through to the masses of the population, and should lead in time to a "health conscious" attitude of mind which will go far to combat the ravages of infectious and other diseases.

DOMICILIARY VISITS.

At the end of the year, there were thirty-one Jubilee and Dudley Nurses in the County, and they all visit the homes of the patients who are too ill to attend at the local clinics.

The total of visits paid by them during the year was divided as follows between the thirty-one nursing districts :—

Annagry	....	267
Ardara	....	261
Arranmore	..	556
Ballybofey and Stranorlar	....	351
Ballyshannon	....	246
Bruckless	..	305
Buncrana	....	60

317 Domiciliary Visits were paid by the Superintendent Public Health Nurse in County Donegal to tuberculous patients during the year.

TIONNSCNAMH i gCOIR LEIGHEAS NA hEITINNE.
(Scheme for the treatment of Tuberculosis).

DONEGAL COUNTY.

Return of number of patients treated under the County Tuberculosis Scheme during the year ended 31st December, 1939.

	Pulmonary Tuberculosis			Non-Pulmonary Tubereulosis			Total
	Children under 15 Year	Other Persons		Children under 15 Years	Other Persons		
		Males	Females		Males	Females	
I. Insured Patients.							
(i) No. remaining under treatment :—							
(a) On 1st January, 1939	—	22	19	—	3	2	46
(b) On 31st Deeember, 1939	—	14	15	—	1	3	33
(ii) No. of new patients treated during year 1939	—	6	4	—	—	1	11
(iii) No. of cases under observation at close of year 1939.	—	—	—	—	—	—	—
II. Other Patients.							
(i) No. remaining under treatment:-							
(a) On 1st January, 1939	54	153	206	71	33	27	544
(b) On 31st December, 1939	46	106	141	65	25	21	404
(ii) No. of new patients treated during year 1939.	15	33	42	23	7	9	129
(iii) No. of cases under observation at close of year 1939.	118	1	4	7	—	—	130

III. No. of patients who received treatment during the year in—

(a)	Institutions under the control of the Local Authority	126
(b)	Extern Institutions	92

28 of the patients treated in Extern Institutions were also treated in local hospitals—1 of them in two local hospitals. They are not included in the figures for local hospitals. 3 other patients were treated in two local hospitals and are counted once only.

The accompanying table shows the admissions to and the discharges from the various local and extern institutions during the year :.

NAME OF INSTITUTION.	Admissions	Discharges or Deaths	No. remaining on 31/12/1939.
Donegal District Hospital	45	54	7
Glenties District Hospital	30	27	14
Carndonagh District Hospital	31	29	16
Letterkenny District Hospital	—	—	—
Lifford District Hospital	19	12	7
Cappagh Open-Air Hospital	5	7	5
Coole Open-Air Hospital	3	6	2
Peamount Sanatorium	27	27	30
Dr. Steevens' Hospital	11	10	6
Newcastle Sanatorium	1	2	—
Linden Convalescent Home	1	1	—
Richmond Hospital	—	1	—
TOTAL	173	176	87

MILK AND DAIRIES.

The following bulletins are derived from specimen sheets proposed by Harvey and Hill ("Milk Production and Control") and have already been distributed to all known milk producers in the County.

As the legislation in this Country differs somewhat from that in England, the bulletins, as herein set out, have been modified and adapted to conform with our legislation in Ireland. We are under a debt of gratitude to Mr. Harnett, Senior Veterinary Inspector, who kindly undertook the rather laborious work of revision and adaptation. Accordingly we wish to express our sincerest thanks to him for his ready co-operation in this important matter.

MILK—PRODUCTION AND CONTROL.

BULLETIN NO. 1—Introduction.

"Clean Milk" and "Dirty Milk."

Clean milk may be defined as raw whole milk from healthy cows, which has a minimum number of bacteria and which is capable of keeping sweet for a reasonable length of time, at least two days, whatever variations in temperature occur.

The word "DIRT" as applied to milk does not necessarily imply only those substances which in everyday life are included under that term. DIRT as applied to milk means rather the presence of BACTERIA in the product. BACTERIA are micro-organisms of varying types, which are so minute that it is necessary to use a microscope of high power before their presence can be detected. Some idea of the size of these microscopic forms of life may be gathered when it is remembered that it takes approximately 25,000 of them placed in a row to measure an inch, that is, to stretch across a half-penny.

It is not possible to exclude all bacteria from milk, but it is possible to reduce to a minimum the number which may gain access.

It is also necessary to exclude all large particles of dust and dirt which may gain entrance to milk and which are usually removed by the process of straining. It must be emphasised, however, that the bacteria to which reference has been made, and which alone are responsible for the milk turning sour, are so minute that they will pass with ease through the finest material used as a straining cloth or pad. Farmers often state that they strain their milk regularly, and, in fact, the results of such straining may be shown, but it must be clearly understood that the most important part of the dirt, namely the bacteria, has passed through the strainer and remained with the milk.

Once milk contains dirt it is impossible to remove it and make the milk clean again.

Milk must, of course, be strained, but mere straining does not remove bacteria, which must not be allowed to enter the milk.

Milk—what it is.

Milk consists of a number of substances in varying proportions, an average analysis being as follows :—

	Per cent.
Water	87.6
Milk Fat	3.5
Protein	3.40
Milk Sugar	4.75
Mineral Matter	0.75

Milk fat is that portion of the milk eoneerned in the making of butter. The proteins consist of substances known as casein and lactalbumen, which are concerned in the making of cheese. Milk sugar eonsists of a substance known as LACTOSE.

Sour milk.

Everyone is aware that milk "turns sour" becoming semi-solid and aeid. Milk may be drawn from the udder of the cow and kept in sealed vessels for weeks without any apparent change. The cause of the souring of milk is therefore some external agent introdueed into milk after it leaves the cow. This external agent consists of baeteria such as we have previously described. These baeteria aet upon the LACTOSE and produec LACTIC ACID. Curdling of the CASEIN subsequently oeeurs and the aetion of the souring is complete.

One of the ehief objects of clean milk production is to prevent the entrance of bacteria into the milk which will be likely to cause it to turn sour. Sueh an object is one of vital economic importance to the trade of milk producers as a whole, because the souring of milk is responsible for considerable financial loss. It has been estimated that the loss due to souring alone is equal to at least 1 per cent. Taking a distriet, say Dublin, in receipt of milk to the extent of about 14 million gallons per annum, this will mean an annual loss, caleulated on a figure of 1s. per gallon, of £7,000.

Bacteriological examination of milk.

In order to ascertain whether or not milk is clean, it must be examined for the presence of bacteria. Milk is examined bacteriologieally in two ways, as follows :-

(1) For total bacterial count and the presence of the bacillus coli ; and
(2) For the presence of tubercle bacilli.

The TOTAL BACTERIAL COUNT indicates whether or not the milk is clean. The number of bacteria may vary within a very wide range. There may be only a few hundreds or less per cubic centimetre, or there may be many millions in a similar quantity. When we consider that a cubic centimetre is smaller than the average lump of sugar, the presence of millions or even hundreds of thousands of bacteria in such a small amount is very unsatisfactory.

It is an offence under the Milk and Dairies Act, 1935, to sell milk which contains more than 500,000 bacteria per cubic centimetre.

It should be the aim of every farmer to produce milk containing not more than 200,000 Bacteria per cubic centimetre.

In addition to the bacterial count, the presence or absence of a special type of bacteria is also determined. This organism is known as the BACILLUS COLI, and represents a group of bacteria which are normally present in the stomach and intestinal canal of the cow, and which are passed from the animal in its dung. These bacteria may also be present as a result of inefficient sterilisation of the utensils. The presence of these bacteria in milk is therefore a definite indication either of excremental contamination or of unsatisfactory cleansing of the milk vessels. Every effort should be made to prevent the entrance of the bacillus coli into milk and IT OUGHT NEVER TO BE PRESENT IN A SMALLER AMOUNT THAN ONE-HUNDREDTH OF ONE CUBIC CENTIMETRE.

The question of tuberculosis in cows and the presence of the tubercle bacilli in milk will be considered in the third bulletin. Sufficient here to say that all cows giving tuberculous milk must be excluded from the herd and promptly slaughtered. It must be remembered that it is an offence liable to heavy penalties to sell milk containing the germ of tuberculosis.

Clean milk production.

In the past too much attention has been paid to the structural condition of cowsheds wherein cows are housed for the greater part of the year, to the almost total disregard of the methods employed in the control of the milk from the moment it leaves the cow. Without in any way under-estimating the importance of good cowsheds, it may be definitely stated that clean milk production depends much more upon the methods adopted in its collection and distribution than upon the possession of elaborate buildings.

Clean milk depends almost entirely upon the methods employed in its production, chief among which is the quality of the labour necessary in the various operations.

Clean milk production.

Milk as it leaves the healthy cow is always clean.

Dirty Milk is due to the addition of bacteria after the milk leaves the cow.

Sour Milk is due to bacteria forming Lactic Acid.

Dirty Milk soon becomes **sour milk** with financial loss to the farmer.

No milk should contain **more than 500,000 Bacteria per cubic centimetre.**

The **Bacillus Coli** should never be present in a smaller quantity of milk than one-hundredth of a cubic centimetre.

Milk containing the Tubercle Bacillus should never be sold.

Methods are more important than buildings.

Chief among the methods is the quality of the labour employed.

Methods should always come first.

BULLETIN NO. 2.

Suitable for Farmers.

THE COWSHED OR BYRE.

The importance of a satisfactory building for use as a cowshed or byre cannot be over-estimated. At the same time a good byre is by no means the only necessity for the production of clean milk. In the past too much attention has been paid to the structural condition of cowsheds with an almost total disregard for the methods employed in the production of milk. Given a cowshed of only moderate construction, it is possible to produce clean milk consistently, **provided regular attention is paid to the cleanliness of the cowshed** in addition to the other points dealt with in these Bulletins. The following points in connection with the care of the cowshed should be noted.

The floor.

The floor of the cowshed, which should be of impervious material, preferably concrete, must be kept scrupulously clean. It is essential

that all dung, etc., should be removed from the cowshed **at least once each day.** The dung must not on any account be moved immediately before milking, as the action of moving the material causes the production of dust and dirt which is liable to enter and contaminate the milk. The dung channel should be sufficiently wide to permit of liquid flowing off at the back to the drain inlet outside the cowshed, and it must be kept as clean as possible to enable this to occur. The dung, etc. should be removed to a point as far away from the cowshed as possible. The practice of tipping dung in a heap in close proximity to the cowshed cannot be too strongly condemned.

The walls.

It is equally important that the walls of the byre should be kept thoroughly clean. Whenever possible they should be rendered in cement to a height of 4ft. 6in. to enable this to be readily carried out. In all cases the whole of the walls and roof in the byre must be thoroughly cleansed and limewashed as often as is necessary and **not less frequently than twice in each year,** once during April or May and once during September or October. It is advisable to add a small quantity of disinfectant to the lime when making limewash.

The roof.

In many old cowsheds the roof is far from satisfactory. Cobwebs and dust are frequently found accumulated in the roof, forming a constant source of contamination to the milk. All parts of the roof must therefore be kept scrupulously clean and frequently limewashed.

Troughs, partitions and yokes.

It is also important that the feeding-troughs, divisions between stalls, and the yokes are kept absolutely clean. They are often found in a filthy condition, particularly the divisions. As these divisions are often made of wood, which at best is a very unsatisfactory material for this purpose, they require constant attention and must be cleansed and limewashed frequently.

Lighting.

In many cases cowsheds are so dark, even in the middle of the day, that it is impossible to see sufficiently well to keep them clean. In every case the cowshed must be provided with a sufficient number of openings to light every part of the interior of the building effectively, and **such openings must be maintained in good order and not in any way obstructed or screened.** In addition to natural light, it is essential that **good artificial light be provided** for use during the

winter months. The old type of lamp is often unsatisfactory, requiring constant attention and not giving a sufficiently bright light. Any of the modern paraffin vapour lamps now on the market will be found to be both efficient in use and economical in cost if electricity is not available.

Ventilation.

This is one of the most important items in connection with the management of the cowshed. Ventilation has a marked influence on the health of the cows and indirectly on the quality of the milk. In cowsheds where there is practically no ventilation and the atmosphere is hot and stuffy, the vitality of the animals is considerably reduced and they are rendered more susceptible to disease. The practice of stopping up air inlets and outlets with straw, etc., to keep the cowshed "warm" cannot be too strongly condemned. It is certainly necessary to protect the animals from **excessive cold,** but it is equally necessary to protect them from excessive heat. It has been repeatedly demonstrated in practice by farmers themselves that cows can withstand wide variations in temperature without any adverse effect upon the health of the animals **or upon the milk yield.** Speaking generally, the cow requires 600-800 cubic feet of free air space. **Adequate and permanent means of ventilation are, however, of infinitely greater value and importance than mere provision of cubic air space.** Unless provision is made for the regular renewal of the air in the byre, it will become foul and contaminated, whatever the amount of free air space provided.

Water supply.

It is impossible to cleanse a cowshed adequately without a plentiful supply of **clean water.** In addition, an abundant supply of wholesome water is necessary for the watering of the cattle. Whenever possible, water should be laid on to the cowshed itself, particularly as it is required for grooming the cows and for washing the hands of the milkers.

Drainage.

Effective drainage of the cowshed is very important. The gully upon which the drainage from the cowshed discharges is often found choked. These drain inlets require constant attention, and a grid should be provided to prevent the entrance of large solids which are liable to choke the drain.

The rules given above, governing the care of the cowshed, are all simple in application but make a huge difference in the pro-

duction of clean milk. Failure to comply with any one of them almost invariably results in contamination of the milk.

Clean milk production—The cowshed or byre.

Regular attention to the cleanliness of the byre is absolutely essential for the production of clean milk.

All **dung** must be **removed at least once each day.**

Dung must **not** be removed immediately before milking.

Dung must be removed as far **from the cowshed as possible.**

The walls, divisions, roof, etc., of the cowshed must be cleansed and limewashed at least twice a year.

Windows and other openings provided for lighting must be maintained in good order and in no way screened.

Sufficient artificial light must be provided.

Ventilation of the cowshed is of the greatest importance.

Excessive heat is as harmful as excessive cold.

Ventilation of the byre in no way affects the yield of milk.

Adequate and permanent means of Ventilation are more important than mere provision of cubic space.

An adequate supply of **wholesome water** is essential.

The drainage arrangements of the byre must be kept in good order.

The cleanliness and Ventilation of the byre are of the greatest importance.

BULLETIN NO. 3.

SUITABLE FOR PRODUCERS.

THE COW.

Diseases of the udder.

It is impossible to produce clean milk unless all the cows in the herd are healthy.

The milk supply is chiefly affected by diseases of the udder. It is necessary to examine the udders of all milking cows regularly and carefully in order to secure the early detection of any abnormality or disease which may adversely affect the quality of the milk or render it dangerous for human consumption.

Inflammation of the udder or **MASTITIS** may be divided into two groups:—(1) ordinary mastitis including **GARGET,** and (2) tubercular mastitis. The chief points of difference between the two groups are as follows:—

(1) Ordinary mastitis.

The quarter affected is hot, painful, and enlarged. The disease commences suddenly. If treated satisfactorily, the inflammation subsides in a few days, after which the gland contains thick, pus-like matter. The milk may contain blood, be flaky or clotted, thick, slimy, or purulent. The affected quarter is often lost.

(2) Tubercular mastitis.

The quarter affected is cold and painless. There is no history of acute inflammation. The quarter very gradually increases in size and hardness and is often lumpy. **The milk may appear normal.**

It will be seen from the above brief summary that the chief points of difference between the two conditions is that in Ordinary Mastitis, including Garget, the affected part of the udder in the acute stage of the disease is hot and painful and the onset sudden, whilst in Tubercular Mastitis, the affected part is cold and painless and the onset gradual. The fact that the milk from a tubercular udder may be normal in appearance should never be forgotten.

It is of the utmost importance that a qualified veterinary surgeon should be immediately consulted on the first appearance of any abnormality in the cow's udder. The condition may only be slight and yield to early treatment and no permanent ill-effects result, but if neglected it may mean the loss of a quarter and consequent reduction in the yield of milk and financial loss to the farmer.

Any person possessing a cow suffering from tuberculosis or suspected to be suffering from this disease, including tuberculosis of the udder, must immediately notify the fact to the local authority administering the Contagious Diseases of Animals Acts, in order that the animal may be dealt with under the Tuberculosis Order, 1926. This order provides for the slaughter of all animals suffering or suspected to be suffering from tuberculosis, payment of compensation being made to the owner based upon the market value of the animal.

The Tuberculosis Order should remove any fear of financial loss to the farmer resulting from the discovery of an animal affected by tuberculosis in his herd.

The early removal of affected animals will prevent the spread of disease to the other animals of the herd. Under the Milk and Dairies Act, 1935, it is provided that a person who sells milk from an animal known to be suffering from tuberculosis of the udder shall be liable to a penalty of £50. In addition to diseases affecting the udder, many other diseases of cows adversely affect the quality and quantity of the milk yield, and it is **unprofitable to the farmer to retain in his herd any animal which is not absolutely healthy.**

Grooming of cows.

Unless all the cows of a dairy herd are regularly and thoroughly groomed, it is not possible to produce clean milk consistently. It is unfortunately a fact that many milking cows are allowed to get into an almost incredible state of filthiness. In many cases the udders and hindquarters are found caked with dung and dirt and in such a condition as to render it impossible to milk the animal without fouling the milk with the dirt.

Whilst it is true that in such extreme cases it is no easy task to cleanse the cows, **it is true to say that, provided grooming is regular, the amount of time necessary is almost negligible.**

The hair on the quarters, the flanks, the portions of the belly adjacent to the udder, and the tail must be kept cut short, and the hair on the udder and teats must be kept closely clipped. The following figures show the influence of clipping the udder upon the bacterial content of milk :—

	Bacteria per c.c.
Cows not groomed, udders not clipped	4,274
Cows' udders clipped	2,505
Cows washed and dried, udders clipped	900

Immediately before milking is begun all dirt on or around the tail, quarters, flanks, udder and teats of the cow must be removed and those parts of the cow then washed with potable water. The udder and teats must then be wiped with a clean cloth which has been damped with potable water.

It is not necessary to dry the udder thoroughly, but it is necessary to see that there are no drops of water left which might find their way into the milking pail. One object of washing is to leave the udder slightly damp in order to arrest any particles of dust which may be present, and thus prevent their entry into the milk. Many farmers are strongly opposed to clipping, grooming and washing the udders of cows because they believe that disease of the udder must necessarily follow. This is not so, as is evidenced in the case of many herds throughout the country in which such practices are carried out daily. It is obviously unwise to undertake the operation in a slipshod manner —for instance, by throwing buckets of water over the animal in a similar manner to washing a cart—but where washing is carried out carefully in a manner indicated, no harmful results will follow. It is as necessary to wash the udders during the summer period as during the winter, otherwise the bacterial content of the milk will increase during that time.

On all farms the horse receives careful attention in grooming, great pride being taken in the cleanly condition of these animals. It does not seem unreasonable to ask that the cow should receive similar treatment, more particularly as it produces such an important foodstuff as milk, which is so susceptible to the action of bacteria introduced with dirt.

The grooming of cows is of primary importance, and it has been proved over and over again that failure to carry out this work has resulted in failure to produce clean milk. The production of clean milk depends entirely upon the continual attention to details, some of which, considered alone, appear trivial and unimportant, but when taken in conjunction with others assume enormous proportions.

Clean milk production.

All milking cows must be **thoroughly healthy.**

Diseases of the udder affect the quality of the milk and also the yield and may be dangerous to the public health.

In **ORDINARY MASTITIS, including GARGET,** the affected part of the udder, in the acute stages of the disease, is hot and painful.

In **TUBERCULAR MASTITIS,** the affected part is **cold and painless, and the milk may appear normal.**

Adequate compensation is now paid for animals slaughtered on account of Tuberculosis

The sale of **TUBERCULOUS MILK** is now a summary offence.

Diseased or abnormal udders must receive the early attention of the **Veterinary Surgeon.**

The **grooming of cows** is essential for the production of clean milk.

Provided grooming is regular, the amount of time necessary **is almost negligible.**

Efficient grooming consists of clipping, brushing, and washing.

Washing of the udder in no way affects the **health of the animal** or results in a diseased udder.

The grooming of cows is essential for the production of clean milk.

BULLETIN NO. 4.

Suitable for Producers.

THE MILKING TIME.

The methods adopted during and immediately after milking are of the utmost importance. **It is absolutely impossible to produce clean milk regularly unless proper methods are consistently carried out at the time of milking.** Many of these details appear of little consequence when studied alone, but collectively they have a considerable bearing upon the cleanliness of the milk. It is not too much to say that this period is the most important in the whole series of operations concerned with the production of milk. In the majority of cases of dirty milk, the original contamination occurs during the period of milking or immediately after, and before the milk is cooled.

Preparation of the cowshed.

The dung should be removed from the cowshed some considerable time prior to milking or after milking, and on no account immediately before such time, as movement of the material causes the dissemination of dust and dirt which float in the air and are liable to enter and contaminate the milk in the milk-pail.

Preparation of the cows.

Attention must again be drawn to the grooming of the udders and hindquarters of the cows which has been dealt with in detail in Bulletin No. 3.

It is sufficient here to repeat that it is impossible **to produce**

clean milk consistently unless the animals are regularly groomed and that such grooming, including the washing of the udders, in no way affects the health of sound, normal cows.

Wherever possible, the animals should not be fed during or immediately before milking. In particular, dusty foods should be avoided as they are liable to produce dust in the atmosphere of the cowshed : also roots, which, if given before or during milking, are liable to flavour the milk and render it objectionable in taste. In the case of restless animals, where difficulty is experienced in keeping them quiet during milking, a little cake will be found useful and may be given without risk of affecting the milk.

Preparation of the milkers.

It is equally important that the **persons engaged in the actual operations of milking should be absolutely healthy.** It is an offence for any persons to milk cows or handle milk if they are suffering from an infectious disease or if they have been recently in contact with a person so suffering or if they are in such a condition that there is a danger of transmitting any disease. Extensive powers are given to Medical Officers of Health to prohibit the sale of milk or the employment of any person where infectious disease is caused or is likely to be caused through the milk supply.

Before commencing milking operations, **all the milkers should wash their hands thoroughly with soap and water.** It is also very important that the milkers should re-wash their hands between the milking of the separate animals. The provision of a clean towel is essential. **The importance of the milkers being healthy and scrupulously clean cannot be over-estimated.**

Clean white overalls should be provided for each milker. This enables dirt to be easily seen on the white cloth, and furthermore fosters a highly desirable spirit of cleanliness among the workers. The use of a clean milking cap is also desirable. Many farmers complain that they experience great difficulty with their farm hands who either refuse or consistently neglect to carry out the simplest rules of personal cleanliness. In such cases it is suggested that continual instruction on the part of the farmer will eventually result in the education of the milker and secure his keen co-operation in the efforts for the production of clean milk. On farms where the farmer has taken some little trouble with his cowmen and milkers, the results have been very gratifying and have amply repaid any time spent in this connection. In any case the production of milk is of such importance as to necessitate continual personal supervision by the farmer himself, and in no case should this work be left entirely to farm hands.

The milking stool.

The condition of the milking stool is frequently neglected, indeed in many eases it can only be described as filthy, its permanent resting plaee appearing to be the dung heap. **The milking stool should be washed and scrubbed regularly** as, in its movements during milking operations, any dirt whieh may lodge on the stool is readily transferred to the milk.

Method of milking.

One of the first essentials of clean milk production is that milking must be dry handed. The abominable and filthy practice of wet milking cannot be too strongly condemned. The statement that dry-handed milking results in sore teats is incorrect and is not borne out in praetiee.

It is very important that the first stream of milk from each teat should be disearded, as a number of bacteria always find their way some distanee up the teat opening, being removed with the first flow of milk. If the first stream of milk is rejected, a marked improvement in the eleanliness of the remainder of the milk will result.

The milking pail.

The type of milking pail used is of considerable importance. **The covered type of pail is of much greater value than the ordinary open bucket.** The objeet of the covered pail is to prevent dust falling from above into the milk. The use of this type of pail for milking is now obligatory.

Whenever possible the milk from each cow should be removed in a covered pail immediately after milking to the dairy. When this is not possible a larger bucket or ean capable of holding the milk of four or five eows and provided with a tightly-fitting cover should be used. The pouring of milk from one vessel to another in the eow-shed should be restricted to a minimum. If milk is poured from vessel to vessel in the cowshed, it is liable to become heavily contaminated by continual exposure to the air.

Clean milk production The milking time.

It is essential that proper methods be employed at the time of milking.

Dung must be removed some **considerable time before milking** begins.

It is impossible to produce clean milk consistently unless the udders and hindquarters of the cows are regularly groomed.

Cows should not be fed before or during milking.

Every person engaged in milking should be absolutely healthy.

All milkers should wash their hands thoroughly with soap and water.

The provision of overalls, including caps, is necessary.

The milking stool should be washed and scrubbed regularly.

Dry-handed milking must be insisted upon.

The practice of wet-handed milking cannot be too strongly condemned.

The first stream of milk from each teat should be discarded.

Covered milking pails must be used.

Milk should be removed from the cowshed to the dairy as quickly as possible.

The cleanliness of the milker and of his clothing is of the utmost importance.

BULLETIN NO. 5.

Suitable for Producers and Distributors.

THE DAIRY AND MILKSHOP.

The dairy includes any room or place in which milk is kept and any shop from which milk is sold. The condition of the dairy is of the utmost importance and it is essential that the milk should be kept in such a manner as to prevent any risk of it becoming contaminated while it remains on the premises. Wherever possible, the dairy should be kept exclusively for the storage of milk or other dairy products.

Construction of the dairy.

The following requirements of the dairy apply more particularly to places in which milk is stored and not necessarily to milkshops.

The dairy should be **well lighted and ventilated.** The floor should be of impervious material, preferably concrete, and wherever possible the walls should be rendered in cement to a height of 4 feet 6 inches. The whole of the internal surfaces above the rendering should be limewashed as frequently as is necessary. There should be an adequate supply of wholesome water for cooling and washing purposes. There should be no drain inlet in the dairy.

Washing-up room.

Wherever possible, the milk utensils should be washed and sterilised in a room apart from the dairy. The washing-up room should be provided with a hot and cold water supply and a proper washing-up sink or tanks, with, if at all possible, facilities for the generation of steam for sterilisation purposes.

Straining of milk.

The provision of an efficient strainer is necessary and such strainer should be of the type in which **STERILE COTTON-WOOL DISCS** are used, each disc being discarded after use. Muslin is not to be recommended because of the difficulty of adequately cleansing and sterilising the material after use. Apart from this, it is not an efficient straining substance. It is important to remember that straining is only a precautionary measure, and affords no true indication as to the cleanliness of the milk.

Wherever a dairyman finds a large quantity of visible dirt in his milk, he should interview the producer and request that steps be taken to improve the methods of production. The consistent supply of dirty milk to a dairyman is sufficient justification for transferring his business elsewhere to a clean-milk producer.

Cooling of milk.

The efficient cooling of milk after it leaves the cow is of vital importance, the inadequate cooling of milk being largely responsible for many cases of early souring.

It has already been explained that the action of bacteria is the cause of the souring of milk, and these bacteria are most active when the temperature is high. The immediate object of cooling milk therefore is to reduce it to such a temperature that the activity of any bacteria which may be present or which may subsequently gain entrance is retarded or prevented.

The wisest plan is for all milk to be **cooled at the place of pro-**

duction. Dairymen will therefore do well to insist that all milk sent to them is cooled before leaving the farm.

The type of cooler is important. It should be capable of reducing the temperature of the milk to at least within 4 degrees or 5 degrees Fahrenheit of the temperature of the water used for cooling purposes. A final temperature of 60 degrees Fahrenheit is desirable. The cooler is one of the most difficult items of apparatus to cleanse thoroughly, and it is important that the **corrugations should be sufficiently wide apart** to render this practicable. The cooler should be carefully covered when not in use to protect it from contamination. It is obligatory to cool milk from May 1st to October 31st if it cannot be delivered to a milk retailer within 2 hours or to a consumer within 4 hours after milking.

Cleansing and sterilisation of milk vessels.

The importance of thoroughly cleansing and sterilising all milk vessels cannot be over-estimated. The first essential is preliminary rinsing for the removal of traces of old milk, etc. **Cold water** must be used for this purpose. After a thorough rinsing with cold water, the utensils should be washed and scrubbed with hot water to remove any traces of fat which remain. The outside of the vessels should also be washed. The utensils should then be **sterilised. Steam is the only reliable means of carrying this out. Scalding** by means of hot water is not nearly so satisfactory or effective. If scalding is adopted, water **boiling vigorously** must be applied to every part of the vessel, including the lid, for a reasonable length of time.

The sterilisation of milk vessels by means of steam does not necessarily mean the provision of expensive apparatus. An ordinary copper can be adapted for this purpose in a convenient manner. A hole is made in the lid to allow for the escape of the steam and the larger utensils, including churns and pails, are placed directly over this. Exposure for 10 minutes will be sufficient for the larger churns.

Smaller vessels should be placed in a galvanised tank, say 2½ ft. x 3½ ft. in size, the bottom perforated with 1-inch holes and provided with a detachable lid. When the water in the copper is vigorously boiling, the tank should be placed on the copper, when steam will enter the tank through the holes. The tank should remain in position while the water is boiling, for about ten minutes after the contents of the tank have reached a temperature of 201 degrees F. After the vessels have been sterilised, great care should be taken to ensure that they are protected from contamination until required again. The practice of leaving sterilised milk churns and cans exposed to the atmosphere cannot be too strongly condemned.

The milkshop.

Milk should only be kept and sold in shops where a purely dairy business is carried on. The practice of selling milk in shops where goods of a non-dairy character are also sold, and which are liable to affect the milk adversely by the dissemination of dust or effluvia, is to be discouraged, unless the milk is sold in the same unopened receptacle in which it has been delivered to the premises. Milk for sale in a dairy should be kept in a clean vessel , carefully protected from all possible sources of contamination and from the influence of heat.

Clean milk production—The dairy.

The dairy should be kept **thoroughly clean and in good order.**

The dairy should be used **exclusively** for the storage of milk.

The dairy should be **well-lighted and ventilated.**

The milk room should be **limewashed** as often as necessary.

There should be **no drain inlet** in the dairy.

All milk should be **strained** through an **efficient strainer.**

Sterile cotton-wool discs are the best articles for straining purposes.

Dairymen should insist that all the milk sent to them by the producer is "**clean milk.**"

The efficient cooling of milk immediately it leaves the cow is of vital importance.

The milk cooler should be capable of being **easily and efficiently cleansed and sterilised.**

All milk vessels must be **thoroughly cleansed and sterilised immediately after use.**

Steam is the only efficient means of sterilisation.

The use of steam **does not necessarily involve the provision of expensive apparatus.**

Milkshops should be used exclusively for the conduct of purely dairy business.

The cooling of all milk and the sterilisation by steam of all milk vessels are of the utmost importance.

BULLETIN No. 6.

Suitable for Producers and Distributors.

THE TRANSIT AND DISTRIBUTION OF MILK.

Milk may be distributed by rail, by road, or by hand, and in each case there are many ways in which it may become contaminated. It must be emphasised, therefore, that, however careful the methods adopted at the place of production have been, these efforts will be very largely wasted if **care is not taken to safeguard the milk from contamination during transit and distribution to the consumer.**

Milk churns.

Considerable care and attention are necessary in the case of the large milk churns in use for the transit of milk. The interior of the churns should be smooth and free from seams, etc., which are liable to collect dust and dirt. Churns are now available which are constructed in one piece without seams. One of the most important parts of the milk churn is the lid. The lid acts as a means of protecting the milk from contamination and also of preventing the wastage of milk through spilling. Many older types of churn are provided with lids having holes for ventilation purposes. These have been found to be quite unnecessary, and in fact, very undesirable since they considerably increase the risk of dirt, etc., entering and contaminating the milk. **Ventilated churns do not assist the keeping quality of clean milk.** A type of churn is to be procured in which an inner disc is provided which entirely prevents contamination due to the entrance of dust and dirt and also prevents loss of milk due to spilling. The 10-gallon milk churn is the most suitable size.

Milk cans, bottles, and smaller receptacles.

The remarks with regard to churns apply with equal force to milk cans, bottles, measures, and other small receptacles. These articles should be of such material and so constructed as to allow of ready cleansing while the interiors should be smooth and free from seams. They should be provided with tightly fitted covers wherever possible. The cleansing and sterilisation of milk churns and other vessels have already been dealt with but the importance of these processes being carried out efficiently must again be emphasised.

Transit of milk by road or rail.

Churns or otner receptacles used to forward milk by road or rail must have the name and address of the owner clearly marked upon them and must be provided with lids without openings so fitted as to prevent the access of dust dirt, etc. Except in certain cases no milk may be removed from a milk churn or a milk churn opened at a railway station or in a railway van.

Distribution of milk by road.

Considerable care is necessary in the distribution of milk by road, on account of the fact that, where milk is not conveyed in sealed glass bottles, it is liable to contamination by dust, dirt, etc., every time the churn is opened for the removal of a quantity of the contents. The churn over four gallons capacity in which milk is contained in the milk float should be provided with a tightly fitting cover and a tap for the removal of the milk. The practice of leaving the lid of a vessel off for some time while several customers are supplied with milk is against all public health principles.

The measures used to remove milk should if practicable be kept inside the vessel ; if not they should be suitably protected. If they are not so kept, they are liable to collect dust and dirt, and the next time they are placed in the milk they will contaminate and spoil the entire supply. The practice of smoking, which is occasionally indulged in by persons delivering milk, is very undesirable. It has been observed in such cases that tobacco ash and dust drop into the milk. It is very important that persons delivering milk should realise the delicate nature of the food which they are handling, and that they should appreciate the absolute need for all precautions necessary to prevent contamination.

The milk float or van.

The vehicle used for the conveyance of milk must be kept thoroughly clean, and no live animals or other article likely to give rise to contamination must be conveyed at the same time as milk is being carried. If at any time the vehicle is used for the conveyance of offensive matter it must be thoroughly cleansed before again being used for the conveyance of milk.

Distribution of milk in cans by hand.

A certain proportion of milk is distributed by hand, and here again certain precautions are necessary to prevent contamination. The cans used to convey the milk should be provided with tightly

fitting covers which should always be kept in position. Particular attention must be drawn to the practice of leaving small cans standing on the pavement in such a position as to permit of dogs and cats having access to the milk. This frequently leads to the milk being fouled and is a particularly objectionable practice.

Distribution of milk in bottles.

This is the ideal method of distributing milk, and is becoming increasingly popular. Clean cooled milk, bottled either at the place of production or at the dairy, can be distributed to the consumer with very little fear of contamination. Care should be taken to ensure that the discs fit accurately and tightly into the necks of the bottles. The discs should be well waxed to prevent absorption of the liquid. Metal caps are, however, more satisfactory for the sealing of bottles. Before use bottles should be sterilised with steam.

The practice of placing milk into bottles on the street is not permitted.

Health of the workers employed in handling or distributing milk.

It is of the utmost importance that every person engaged in the handling or distribution of milk should be absolutely **healthy.** It is the duty of any person suffering from an infectious disease or who has been in contact with such a case and who is employed by a cowkeeper or dairyman to notify his employer, who in turn must immediately notify the Medical Officer of Health of the district. The employment of any person likely to spread infection or contaminate the milk may be prohibited.

Clean milk distribution—The distribution of milk.

The value of the production of clean milk is very largely wasted if the milk is not **protected from contamination during distribution.**

Milk churns should be **smooth and seamless.**

Milk churns should be provided with a tightly fitting lid, without openings.

Ventilated churn lids do not assist the keeping quality of **clean milk.**

Milk cans and smaller receptacles should be capable of being **easily cleansed.**

Adequate cleansing and sterilisation of milk vessels are essential if milk is to remain sweet and fresh.

The practice of **smoking** whilst delivering milk is to be condemned.

The **milk float** must be kept thoroughly clean and only used for the conveyance of milk.

Milk delivered by hand should be kept in closed receptacles.

The practice of leaving small cans containing milk on the pavement within reach of dogs and cats is very undesirable.

The **distribution of milk in bottles is the most satisfactory method.**

Persons coming into contact with milk should be absolutely **healthy.**

Vessels containing milk should have tightly fitting covers.

BULLETIN NO. 7.

Suitable for Consumers.

THE CARE OF MILK IN THE HOME.

Milk is one of the most important and useful foods in existence as it is an almost perfect food for infants, being liquid and containing those substances required to build up the body. Because it is a liquid and contains those important substances, it is a most delicate article, easily contaminated and turned sour.

Milk may turn sour and become dangerous to those who consume it because of the action of GERMS or BACTERIA. These germs, although they may be very harmful, are so small that they cannot be seen by the naked eye. In fact, it requires 25,000 of them to stretch across a halfpenny piece. This will convey some idea of their extremely small size. Germs, like human beings, are alive, requiring food to live. They thrive and multiply best in foods like milk, because of the properties mentioned above.

In order to keep milk sweet for a reasonable length of time and so obtain the greatest advantage from it, the milk must be protected in such a way that harmful germs do not find their way into it. This means that the farmer must exercise great care in producing milk on the farm. He has to keep the cows, cowsheds, and all utensils which come into contact with the milk thoroughly clean. If he does

this he is able to supply health-giving milk to the public which will keep sweet, even in the hottest days of summer.

Milk should always be cold when received from the milkman. It is very unwise to ask for "warm milk." The warmer milk is the more suitable does it become for the grwoth and multiplication of germs.

Unless milk is carefully stored in the home, it will quickly turn sour and be useless, however clean and sweet it is when delivered by the milkman, firstly because germs may enter the milk through the agency of flies, etc., and secondly because there are always some germs in milk which, under favourable conditions, will multiply very rapidly.

Every person should see that in their home special attention is consistently paid to the care of milk. In the first place, the **milk vessel should be quite clean before** the milkman puts the fresh milk into it. If the milk vessel is left on the doorstep, it should be carefully covered, in order to keep it clean and protect it from contamination. It should also be kept in a **cool place.** It should never be placed near fireplaces, gas stoves, cookers or gas-boilers, or any other place where it is likely to become warm. Germs always thrive and flourish best in warm places. In summer the milk vessels should be covered with absorbent cloth or muslin and kept in a bowl of fresh cold water, so that the covering cloth or muslin will remain moist, in order to keep the milk as cool as possible. The milk vessel should always be **covered.** This is necessary to prevent contamination by dust and to prevent flies, which carry many germs on their bodies, having access to the milk. Milk should never be placed near any article or food-stuff which has a strong smell, particularly fish, because it is likely to absorb the smell and become objectionable to the palate.

The milk vessel should be washed out immediately after use. It should first be washed out with cold water to remove any traces of old milk and then be scalded with **boiling water to sterilise** the whole vessel. After that is done, it should be kept covered until required again. When milk is required for use, it should be removed from the milk vessel, but only in sufficient quantities for immediate requirements. Any milk left over should never be poured back into the original fresh milk vessel because, if it has become contaminated this will render the whole of the milk unfit for use.

Always remember that milk is the most delicate article of food in use in the home, requiring the greatest care and attention. If the suggestions made in this Bulletin are carried out, there should be no difficulty in keeping milk fresh for any reasonable length of time.

If you carry out these recommendations regularly and consistently and still your milk does not keep as long as you think it ought to, consult your local milk inspector who will endeavour to find out the cause and have it remedied.

The care of milk in the home—Remember !

Milk is a **most useful and important food** which is **easily contaminated.**

Milk turns **sour and becomes dangerous** when **germs** gain access to it.

Germs thrive in warmth, therefore **keep your milk in a cool place.**

Always **cover** your milk vessel and keep it scrupulously **clean.**

Wash your milk vessel **immediately after use** with **cold water** followed by **scalding.**

Never pour unused milk back into the original fresh milk vessel.

These precautions are of the utmost importance and must be carried out, **not** sometimes, but **always.**

The **RIGHT WAY** means :—**A clean milk vessel kept in a cool place and always covered.**

MILK AND DAIRIES ACT, 1935.

The following table shows the details of applications made and applications granted, up to 31st December, 1939, for the County Health District :—

District	Veterinary Officer	No. of Applications	Number granted and Registered
Donegal	F. McShane	63	24
Buncrana	R. Marner	76	28
Milford	E. O'Hagan	25	5
Letterkenny	P. McGlinchey	95	37
Glenties	T. A. McClintock	129	73
TOTAL		388	167

With regard to the Urban Districts of Letterkenny, Bunerana, and Bundoran, the following Table shows the state of affairs at December 31st 1939.

URBAN DISTRICT	No. of Applications	Number Granted	Number Refused
Letterkenny	34	13	18
Buncrana	9	8	—
Bundoran	28	12	—
TOTAL	71	33	18

List of Persons recommended to the Donegal Board of Health and Public Assistance for Registration under the Milk and Dairies Act, 1935. (Up to 5th April, 1940).

NAME.	ADDRESS.
Robert Ward	Higginstown, Ballyshannon.
William John Baskin	Drumnacrosh, Kilraine.
Madge Byrne	Leabgarrow, Arranmore.
Robert Crummer	Summy, Portnoo.
Manus Gallagher	Aphort, Arranmore.
Sighle Ni Cheallaigh	Baile an Easa, An Fal Carrach.
Mrs. Kate O'Hara	Leabgarrow, Arranmore.
Mary Gallagher	Cloughcor, Arranmore.
Mary Dickson	Fahan House, Fahan.
Darby McGlynn	Fintown.
Neil Rodgers	Illion, Arranmore.
Nellie Greene	Scraigathoke, Arranmore.
Miss Brigid Gallagher	Meenacreva, Gweedore.

NAME	ADDRESS.
Mrs. Mary F. Gallagher	Torries, Arranmore.
Condy Gallagher	Gortgar, Arranmore.
James Nelis	Meeting-house Street, Raphoe.
Robert John Campbell	Ramelton.
Neil Gallagher	Torries, Arranmore.
Frank Gildea	Drimnacrosh, Kilraine.
John O'Donnell	Madavagh, Lettermacaward.
Patrick Cannon	Post Office, Lettermacaward.
Charles Magee	Garvin, Cloghan.
Mary J. O'Byrne	Malinbeg, Lifford.
Peter McCauley	Doochary.
Con Duffy	Glenahilt, Burtonport.
Mrs. Peter McGee	Meenmore, Dungloe.
John McGlinchey	Druminardagh, Donegal.
Thomas Breslin	Doohill North, Ardara.
Mrs. Bridget Gallagher	Poolawaddy, Arranmore.
Madgie P. Ward	Aphort, Arranmore.
Mrs. Joseph Coyle	Crolly.
Edward Greene	Ranafast, Annagry.
Hugh Hanlon	Cloughwilly, Lettermacaward
Mrs. Grace Gallagher	Scraigathoke, Arranmore.
Matthew McCay	Inch Level, Burt.
Miss Ellen Ward	Tory Island.
Edward O'Kane	Cavan, Killygordon.
Edward McFadden	Glassagh, Derrybeg.
David Quigley	Malin Street, Carndonagh.
Robert Foster McLaughlin	Parks, Carndonagh.

NAME	ADDRESS.
Robert Moore	Churchtown, Carndonagh.
George Doherty	Diamond, Carndonagh.
James Faulkiner	Coolkenny, Glengad, Malin.
Michael Crossan	Dunfanaghy.
Sharkey & Co.	Annagry.
Hugh Boyle	Crickamore, Dungloe.
Condy Boyle	Acres, Burtonport.
Edward McGrath	Maas, Glenties.
Patrick McGrath	Kilkenny, Glenties.
McDonagh & Co. (Mary Reid)	Bank Place, Carndonagh.
Charles J. Scott	Tulnaree, Carndonagh.
John A. Doherty	Malin Street, Carndonagh.
John White	Chapel Street, Carndonagh.
Edward Sweeney	Mullindrait, Ballybofey.
Robert Osborne	Carnisk, Ramelton.
Patrick Gildea	Stranalough, Glenties.
James McBride	Carrickataskin, Derrybeg.
Mrs. Annie Boyle	Lower Maas, Glenties.
Thomas Coll	Lunniagh, Derrybeg.
Andrew Ward	Lunniagh, Derrybeg.
Michael O'Donnell.	Kerrytown, Meenbanid.
Patrick Dunleavy	Kilkenny, Glenties.
Mrs. A. Campbell	East Port, Ballyshannon.
Hugh Cassidy	Drumbar, Donegal.
Wm. S. and A. M. Bigger	Main Street, Ballyshannon.
Andrew Gallagher	Ballybun, Castlefin.
William McKinley	Glencrow, Moville.

NAME.	ADDRESS.
William McMahon	Milford.
Mary Moran	Laghey.
Frank Cassidy	Drumlonagher.
Michael Byrne	Liscooly.
Edward Carlin	Mullinbuoy, Castlefin.
John Boyle	Doocy House, Lettermacaward.
John McDaid	Druminor, Buncrana.
Daniel McGettigan	Malin Road, Moville.
Brigid McHugh	Towney, Kilcar.
Thomas William Grier	Aughnish, Ramelton.
Michael O'Donnell	Castruse, Bogay.
Edward Gillespie	Killyverry, Newtowncunningham.
Matthew Graham	Ardagh, St. Johnston.
Mrs. Patrick Doogan	Meenacladdy, Meenlaragh.
Patrick Craig	Drumnasillagh, Glenties.
Cornelius Bonner	Ballintra, Arranmore.
Peter Boyle	Mully, Glenties.
John Boyle (Roe)	Fallagowan, Arranmore.
Miss Susan Rodgers	Inniskeeragh Island.
Mrs. Mary Ferry	Innishboffin, Meenlaragh.
Mrs. Annie O'Donnell	Meenbanad.
Andrew Snodgrass	Murlog, Lifford.
Frank McNelis	Cuskerry, Kilcar.
Kate McNelis	Cuskerry, Kilcar.
James Patrick Griffin	Mill Street, Pettigo.
Samuel Hunter	Tubberkeen, Dungloe.

NAME	ADDRESS.
Edward McGrath	Ballyeriston, Glenties.
Andrew Boyle	Ballyara, Killybegs.
Norah Rodgers	Inniskeeragh, Burtonport.
Mrs. Mary McCahill	Drimgorman, Inver.
Patrick McDermott	Foden, Carndonagh.
John J. Martin	Drumdoit, Castlefin.
John Taylor Harper	Maghereagh, Castlefin
John Parks	Tirharon, Manorcunningham.
James Gallagher	Drimanoo, Killybegs.
John Stevenson	Ballyare, Coolboy.
Mrs. Ellen McCready	Derrylaconnell, Doochary.
Charles C. Duncan	Tullyard, Glenties.
Mary Ward	Fallagowan, Arranmore.
Hugh Doherty	Lifford Common, Lifford.
John J. Arnold	Kiltyferrigal, Cloghan.
John Coll	Longfield, Lettermacaward.
Daniel Houston	Ardrummon, Letterkenny.
William Porterfield	Fassetmore, Letterkenny.
Peter McLaughlin	Ballyhaskey, Newtowncunningham.
Patrick McDevitt	Glentoskert, Glengad.
Edward McFadden	Gortcally, Kerrykeel.
Hugh Gallagher	Carrigart.
Robert Porter	Meenargan, Ardara.
Richard G. Lynch	Garshuey, Bogay, Newtowncunningham.
Patrick Brennan	Hillhead Ardara.

NAME.	ADDRESS.
Charles Gallagher	Ballymacahill, Frosses.
Elizabeth Laird	Guest House, End Street, Raphoe.
Edward McCoy	High Road, Letterkenny.
James Glenn	Moyle Hill, Newtowncunningham.
Joseph Doherty	Terhoran, Clonmany.
Mrs. Jeannie Walsh	Ballinamona, Ballybofey.
John McDowell	Carrowreagh, Burt.
John Farren	Cregan, Carndonagh.
Patrick Boyle	Woodhill, Ardara.
Samuel McArthur	Carnmaddy, Burt.
Edward Strain	Forquar, Milford.
Robert A. Gourley	Carnshannagh, Raphoe.
Francis Dunnion	Admiran, Stranorlar.
Isabella Irwin	Dromore, Mountcharles.
Patrick McLoughlin	Castlemurray, Dunkineely.
John Gallagher	Ballymacahill, Frosses.
Patrick McHugh	Selacis, Letterbarrow.
Francis Callaghan	Castlebane, Ballybofey.
Mrs. Margaret Murphy	Glenfin Street, Ballybofey.
W. C. Stephenson	Dromore, Letterkenny.
Joseph Crawford	Kinletter, Ballybofey.
Daniel Houston	Ardrummond, Letterkenny.
James Black	Blanketnook, Newtowncunningham.
William Johnston	Eden, Rosbeg, Glenties.
Joseph Friel	Middletown, Derrybeg.
Mary O'Donnell	Innishmean Island, Derrybeg.

NAME.	ADDRESS.
James Strain	Forquar, Milford.
Robert Morrow	Raphoe Demesne, Raphoe.
William Weir Gourley	Tober, Ballindrait.
William John Young	Kilgoal, Ardara.
James Doherty	Corvin, Linsfort.
Eamonn Sweeney	Fallagowan, Arranmore.
Joseph Allen	Aughliard, Manoreunningham.
Bridget Brogan	Quay Street, Donegal.
Peter Greene	Loughanure, Annagry.
Joseph Gallagher	Ballymacahill, Frosses.
Patriek MeDermott	Glengad, Coolkenny.
Frank MeClean	Dromore, Letterkenny.
William Platt	Ray, Manoreunningham.
Mrs. Annie Ward	The Glen, Belcruit, Kincasslagh.
Michael Boyle	Ranafast, Annagry.
Isabella Porter	Diamond, Raphoe.
Mary Sharkey	Mullaghduff, Kincasslagh.
Mary Boyle	Glenahilt, Burtonport.
Hugh O'Donnell	Porthall.
MeCauley Brothers	Moville.
William Kelly	Main Street, Donegal.
James Gavigan	Main Street, Ballyshannon.
Martin Moyne	Drumhaggart, Muff.
Ned Sweeney (Dan)	Meenmore, Dungloe.
William McDaid	Culkenny.
Mary Sharkey	Ranafast, Annagry.

NAME.	ADDRESS.
Joseph Russell	Cavan Upper, Killygordon.
Maggie Elliott	Longfield, Lettermacaward.
William Robinson	Rye, Manorcunningham
William Toye	Rye, Manorcunningham.
Joseph Hughes	Lurganboy, Donegal.
John McMullin	Tully, Donegal.
John Joseph Walls	Rath House, Ballintra.

List of Persons recommended to the Letterkenny Urban District Council for Registration under the Milk and Dairies Act, 1935.

NAME.	ADDRESS.
John Duffy	Rosemount Terrace, Letterkenny.
William Platt	Ray, Manorcunningham.
Francis McClean	Dromore.
Thomas McKendrick	Lower Main Street, Letterkenny.
John Keys	Lower Main Street, Letterkenny.
Daniel Diver	Lower Main Street, Letterkenny.
William C. Stevenson	Dromore, Letterkenny.
Patrick Callaghan	Port Road, Letterkenny.
Edward McCoy	Kilmacrenan Road, Letterkenny.
Joseph Allen	Anghliard, Manorcunningham.
William Porterfield	Farcetmore, Manorcunningham.
John Hunter	Lisnaneen, Letterkenny.

List of Persons recommended to the Buncrana Urban District Council for Registration under the Milk and Dairies Act, 1935.

NAME.	ADDRESS.
Hugh McGonagle	Main Street, Buncrana.
Denis McGonagle	Main Street, Buncrana.
Richard G. Lynch	Garshuey, Newtowncunningham.
Mrs. Winnie McLaughlin	Townsend Street, Buncrana.
John McDaid	Druminor, Buncrana.
Edward McKinley	Main Street, Buncrana.
James Black	Blanketnook, Newtowncunningham.
Patrick Kavanagh	Main Street, Buncrana.

List of Persons recommended to the Bundoran Urban District Council for Registration under the Milk and Dairies Act, 1935.

NAME.	ADDRESS.
Catherine Flaherty	Magheracar, Bundoran.
John Daly	Magheracar, Bundoran.
William Gilmartin	Glena Lodge, Bundoran.
Bernard Granaghan	Ardfarna, Bundoran.
Rev. Peter Connolly	St. Joseph's Orphanage, Bundoran
Peter Clancy	Century House, Bundoran.
Mrs. Sarah Keenan	Ardfarna, Bundoran.
Mrs. Rose Harte	2 Bundoran House, Bundoran.
Catherine Gilmartin	Ardfarna, Bundoran.
Lewis Gilvary	Magheracar, Bundoran.
Patrick Kerrigan	Ardfarna, Bundoran.
Micheel Kennedy	Ardfarna, Bundoran.

FREE MILK SUPPLY SCHEME.

Under the County Health District Free Milk Scheme, milk was supplied to 1,682 necessitous children under five years of age during the year ending 31st December, 1939. The cost was £2,978 5s. 10d.

Owing to the scarcity of registered dairymen in a number of districts, it was not possible to arrange for the supply of liquid milk in such areas, and dried milk powder was substituted. The recipients appear to regard the powder as satisfactory, and there has been no report of abuse in its distribution or use.

BUNDORAN URBAN DISTRICT.

Free Milk Scheme in operation from 1st April, 1938, to 31st March, 1939.

Average number of children per day in receipt of milk—5.

Total amount of milk supplied—165 gallons.

Committee in charge—Councillors James Murphy (Chairman), John Spratt, and Terence Meehan, with three members of the Legion of Mary.

BUNCRANA URBAN DISTRICT.

The cost of the Free Milk Scheme amounted to £13 19s. 7d.

LETTERKENNY URBAN DISTRICT.

No Scheme was formulated, the amount allocated from the State Grant being only £20 2s. 5d. I am advised by the Town Clerk that other towns similar in population to Letterkenny receive over five times that amount, while much smaller towns receive over £70.

MATERNITY AND CHILD WELFARE.

The accompanying Table sets out the various activities comprised under the above heading. :—

Maternity and Child Welfare Activities, 1939.

DISTRICT	Expectant and Nursing Mothers.	Visits Paid	Infants under 1 year.	Visits Paid.	Children under 5 years.	Visits Paid.
Annagry	134	1,496	62	1,208	174	1,774
Ardara	112	896	40	387	128	1,223
Arranmore	46	762	32	500	84	1,033
Bellybofey and Stranorlar	102	1,507	62	1,308	209	2,205
Ballyshannon	58	1,311	50	504	185	1,369
Bruckless	48	185	30	185	91	1,809
Bunerane	176	1,656	79	316	189	756
Bundoran	54	1,050	32	832	111	2,860
Carndonagh	126	559	47	520	159	630
Carrigart	79	997	50	684	152	1,380
Clonmany	80	426	71	426	230	1,734
Convoy	93	564	36	514	144	1,735
Derrybeg	90	821	27	235	80	963
Donegal	109	667	89	610	187	1,570
Dooehary	33	240	26	338	76	912
Drumholm	110	1.174	71	1,083	110	884
Dunfanaghy	58	1,084	28	440	110	1,144
Dungloe	97	648	54	640	163	1,577
Fanad and Inch	72	224	54	394	137	1,340
Fanad No. 1	45	392	34	469	119	1,405
Fanad No. 2	99	472	43	200	126	734
Frosses	79	544	64	489	176	1,564
Glencolumbkille	93	558	80	692	84	643
Cortahork and Falcarragh	190	2,659	130	2,351	218	3,261
Kilcar	76	285	42	404	155	797
Letterkenny	167	1,002	159	1,431	358	2,153
Lifford. Clonleigh and Castlefin	129	1,738	86	960	331	2,226
Moville	82	1,193	72	1,500	146	2,556
Ramelton	120	979	76	970	160	1,420
Rathmullan and Glenvar	73	894	48	741	116	2,045
Muff and Upper Moville (4 months)	58	162	27	94	56	64
Fintown	40	240	24	230	131	786
Glenties	31	276	20	180	90	270
Gortnasillagh	18	72	8	76	38	176
Kincasslagh	23	300	22	88	50	150
By Supt. P. H. Nurse Casey	195	277	147	292	350	560

BREAST-FEEDING.

The artificial feeding of infants is a comparatively recent innovation: it was not introduced until the eighteenth century. The mechanism of breast-feeding differs from that of bottle-feeding; when at the breast the infant does not excite the milk to flow by suction (aspiration), but by mechanically stimulating the gland to pour forth its suction reflexly, just as happens in milking the cow or the goat. Sucking necessitates considerable activity of the tongue and the muscles which close the mouth. To some extent this muscular activity is lost when artificial substitutes for the mother's breast are made, and measurements have been given by Sir Frank Colyer which would indicate that the dental arch is not so broad by nearly 1 mm. in bottle fed children as in the normal. When the gnawing stage is reached—that is, before the incisor teeth commence to erupt—the muscles which close the mouth are still further used. When still further the incisor teeth are used for gnawing habitually and strenuously as is natural to healthy children, over-eruption of the incisor teeth is unlikely to take place.

Bottle-feeding, on the other hand, involves suction; notably was this the case when the bottle was furnished with a long tube: the effect of this suction is to diminish the pressure within the mouth and to draw the cheeks in, the total effect being to narrow the jaws, and to cause protrusion of the front teeth. A comparison of models taken of breast-fed and bottle-fed children shows the jaws to be slightly narrower and the teeth slightly more protruded in bottle-fed children. There are many reasons why a woman should suckle her own children. From the first dawn of mammalian life, Nature has been evolving types of milk, nicely adjusted, in respect of proteins fats, saccharides, salts and vitamins, to the digestive and nutritive requirements of the young of each individual species of mammal. So exquisite is this adjustment that the milk of each species undergoes a progressive modification as the period of lactation advances, in accordance with the subtly changing nutritional needs of the offspring.

We may rely upon the wisdom of Nature. We may rest assured that the milk of any given species is better adapted to that species than any other. Must we not therefore conclude that the best milk for the human infant is that of the human mother?

The duty of the mammalian mother to suckle and tend her young until they can fend for themselves is not a man-made duty; manifestly it is a duty imposed by nature. Nor must it be forgotten that the mother by suckling her infant establishes a peculiarly intimate bond between the two, one which no mother should willingly forego. If then the healthy mother jeopardises the health of her child by refusing it her own milk, she is robbing it of a heritage which has evolved and been handed down through the ages.

Every woman should make an attempt to suckle her child and undertake the sacrifices of motherhood. The plea is often put forward that the mother is incapable of suckling her infant; it has been proved beyond all doubt that, even among the super-civilised, the vast majority of women, in the absence of serious disease, are capable of this function. Persistent endeavour rarely fails to induce a flow of milk.

In judging the respective values of breast-feeding and bottle-feeding we need of course to take into account the remarkable adaptability of the animal organism. Dr. Meyers has said "Some children can be brought up on almost anything" and Dr. Cameron has drawn attention to the child's capacity to "recover a perfect state of nutrition after a most unsatisfactory infancy."

Nevertheless the supreme care which Nature has taken in devising a specific type of milk varying with every successive phase of lactation, for every species of mammal, must surely be in the interest of the offspring.

Care should, of course, be taken that the nursing mother is adequately fed. There is no evidence that cow's milk possesses any special value for the nursing mother, nor is a daily allowance of "stout" indicated. She should partake freely of ordinary food and lead, as far as possible, a healthy life.

The clinical importance of breast-feeding has always been recognised by paediatricians, if only for its markedly favourable influence on infant mortality. Dr. Spence, speaking at the annual meeting of the British Medical Association in 1938, reminded his hearers that the infant mortality in England and Wales remains twice as high as that in many other countries, and that in some of the industrial towns it remains three times as high as it is, for example, in towns of similar size in Australia. This meant that of the 40,000 deaths of infants each year in Britain, 20,000 might be prevented, or to bring it nearer home, of the 500 infant deaths which take place each year in some of the industrial towns of England, at least 300 could be prevented.

It is safe to assume that, apart from the little milk that may be yielded in the first few days, 20 to 30 per cent. of babies are artificially fed from birth in many if not most of the big towns, and that not more than a third of the mothers of these towns are fully feeding their babies until the sixth month. Bottle-feeding, unfortunately, is a habit which is apt to spread by example.

Feeding and the infant's health.

Modern advertisements and other agencies have persuaded large numbers of women that artificial feeding is entirely safe and satis-

factory for their infants and not disadvantageous to themselves. It is beyond all question, however, that breast-fed infants show a greater freedom from disease and a greater power of recovery from disease than artificially fed infants. The results in pyloric stenosis give straightforward evidence about this. In the Newcastle Babies Hospital the mortality in 114 breast-fed infants with pyloric stenosis was 5 per cent., but in 133 bottle-fed infants it was 30 per cent. But the most complete evidence is to be obtained from the studies of Grulee and Sanford in Chicago. They investigated the morbidity rates and mortality rates in 20,000 infants. Including every minor disturbance of health, the sickness-rate in the breast-fed group was 37 per cent., in the partially breast-fed group 53 per cent., and in the artificially fed group 63 per cent. The death rates were still more striking. Of their 9,749 breast-fed infants only fifteen died, of 8,605 partially breast-fed fifty-nine died, and of 1,707 artificially fed infants 144 died. These figures are significant enough to require no elaboration. But apart from the immediate significance of high morbidity rates and high mortality rates in artificially fed infants, there may be remote ill effects which have not yet been recognised nor defined. It is possible that some of the serious degenerative diseases of adult life have their origin in the artificial feeding of infancy.

Breast feeding and the mother.

There are difficulties in approaching this question of the effects of breast-feeding on the mother herself, as there is a lack of scientific information on the subject. It might be suspected that women who have cut short the reproductive cycle by failing to lactate would be prone later to develop endocrine disorders. The pathological obesities which sometimes follow pregnancy suggest that a mismanagement of lactation may be an example of this.

The effect of lactation on the mother's character, temperament and mental outlook deserve equal consideration with the physical or biological effects. If one is to judge by the look of supreme content that comes over some women's faces as they feed their infants, there must be a sense of achievement in the act which has a definite value in maintaining their mental health.

Lactation.

There are wide variations in the time and rate at which lactation is established. This is well recognised, but it is not sufficiently understood that lactation may have been prevented for several weeks, and yet be re-established. Dr. Spence has seen it re-established eleven weeks after parturition in a woman who had resorted to bottle-feeding her infant, and who had not previously secreted any breast milk either by suckling or by manual expression.

Concerning the normal mechanism of lactation, what percentage of women are incapable of breast-feeding because of physical abnormalities ? Less than one cow in a thousand fails to lactate. Is the greater number of women who fail due to inherent structural faults or to environmental causes ? In some rural districts 95 per cent. of women successfully establish their lactation, though this percentage is diminishing even in remote rural districts in Ireland. The natural mechanism which has allowed a woman to conceive and give birth does not at that stage fail to provide for lactation. There remain a few, less than 5 per cent. in whom it is physically impossible to establish lactation either because of diseased or malformed nipples or because the infant cannot suck on account of mental defect or of cleft palate or other physical fault. All women who are not handicapped by these physical defects can breast-feed their infants if they desire to do so and if they are not prevented by an unsuitable environment.

Dr. Spence says :—I believe the chief cause of failure in establishing lactation is due to mismanagement. To explain this I can do no better than quote from a letter from Dr. Grulee : " My personal opinion is that all this talk of the modern woman being unable to nurse her baby is due very largely to the modern nurse's tendency to poke a bottle of milk in the baby's mouth, which is of course often due to the indifference of the physician." He goes on to describe that in one of his hospitals less than 50 per cent. of babies were breast-fed at one period. They have now been able to raise this to almost 90 per cent. simply by refusing to give the child a bottle in the first week of life. If fluid is required, a little is given from time to time in a medicine -dropper. The attitude of the nurse at this stage is naturally of supreme importance. It is safe to say, in most cases, that if she persists, even to the extent of cajolery, if necessary, the important battle for breast-feeding is won.

SUPERVISION OF MIDWIVES.

Miss Casey, Superintendent Public Health Nurse, reports as follows :—

120 Visits of Inspection were paid to 83 Midwives. The work of the Midwives was generally satisfactory. Handy-women were reported to have practised Midwifery in the Cross Roads (Falcarragh) and Killygordon districts. The cases were reported to the County Medical Officer of Health.

Six Midwives attended the Post-Graduate Course in the Coombe Hospital, Dublin.

The following is a summary of the various notifications received during the year 1939 from the Midwives practising in the County :—

1.	Notifications of Intention to Practise	83
2.	Emergencies for which Medical Aid was summoned :—	
	Abnormal Presentations	27
	Abortions (threatened and complete)	7
	Albuminuria	2
	Ante-partum Haemorrhage	4
	Collapse of Patient after Delivery	2
	Deformities	2
	Delayed Labour and Uterine Inertia	64
	Illness of Baby	2
	Miscarriage	2
	Post-partum Haemorrhage	4
	Premature Birth	4
	Puerperal Pyrexia	4
	Retained and Adherent Placenta	10
	Rupture of Perineum	18
3.	Notifications of Still Births	32
4.	Notifications of Deaths	11
5.	Notifications of Artificial Feeding	8
6.	Notifications of Having Laid Out a Dead Body	6
7.	Notifications of Liability to be a Source of Infection	6

NOTIFICATION OF BIRTHS.

The toal number of births notified to this Department during the year 1939 was 1,814. The total number of registered births for Donegal for the year was 2,448, so that the notified cases represent

74 per cent. of the total births in the County. The percentage of births notified in 1938 was 74.7 and in 1937 the figure was 74.

WELFARE OF THE BLIND.

The County Scheme administered by the Donegal Board of Health and Public Assistance is detailed in previous annual reports. Briefly, it is as follows :—

1. A register of blind persons in the County is kept up-to-date.

2. Arrangements are made by the Board for the following :—

   (a) The education or industrial training of suitable blind persons between the ages of five and thirty years.

   (b) The employment in Workshops for the Blind of blind persons suitable for such employment, their maintenance in a Hostel, and the augmentation of their wages.

   (c) The maintenance in Homes, of blind persons, who, owing to age or infirmity, are incapable of work.

3. The Board may, in the case of unemployable and necessitous blind persons ineligible for education or industrial training under the Scheme, and living in their own homes, or in lodgings, grant assistance to such persons in accordance with the following scale :—

	Per Week.
(a) Blind persons over 15 years and under 30 years of age	10/-
(b) Blind persons 30 years of age and upwards	4/- with pension.
(c) Married man under 30 years of age with wife dependent on him	15/-
(d) Married man 30 years of age and upwards with wife dependent on him	8/- with pension.
(e) Additional allowance for each child	2/6

The institutions approved by the Minister under the provisions of this Scheme are :—

NAME OF INSTITUTION.	Class of Blind Persons Received
1. St. Mary's Institution for Female Blind, Merrion County Dublin.	Females; also boys up to 7 years of age.
2. St. Joseph's Asylum for Male Blind, Drumcondra, Dublin.	Males.
3. Richmond National Institution for Industrious Blind, 41 Upper O'Connell Street, Dublin.	Males.
4. Cork County and City Asylum for the Blind. Infirmary Road, Cork.	Males and Females.

At the end of the year, five persons were receiving institutional benefit. It was decided by the Board to forward, as from 1st January, 1939, monthly paying orders direct to persons in receipt of cash allowances in their homes, who had previously obtained the benefit through the hands of the Assistance Officers, as Home Assistance. The number of such persons at the end of the year 1939 was 27. The total payments to patients in their own homes during the year amounted to £267 1s. 8d.

SALE OF FOOD AND DRUGS ACTS.

The practical administration of this important legislation is entrusted to the Garda Siochana, who carry out their task with their accustomed courtesy and efficiency. I wish to express my thanks to the Chief Superintendent for the County, who has kindly supplied particulars of work done in regard to the taking of samples and analysis of same. :—

COUNTY OF DONEGAL.

RETURN OF SAMPLES OF FOOD AND DRUGS ANALYSED DURING THE YEAR ENDED 31st DECEMBER, 1939.

NATURE OF SAMPLE	No. of Samples Taken	No. Certified to be adulterated	No. of Prosecutions	No. of Convictions
Whole Milk (a)	360	14	13	11
Buttermilk	26	—	—	—
Butter	76	1	1	1
Cheese	23	—	—	—
Margarine	74	—	—	—
Tea	4	—	—	—
Jam	17	—	—	—
Cocoa	5	—	—	—
Coffee	—	—	—	—
Sugar	6	—	—	—
Cornflour	1	—	—	—
Lard	6	—	—	—
Condensed Milk	1	—	—	—
Flour	1	—	—	—
Rice	8	—	—	—
Tapioca	—	—	—	—
Pearl Barley	—	—	—	—
Lemon Curd	—	—	—	—
Cream of Tartar	7	—	—	—
Mincemeat	1	—	—	—
Suet	1	—	—	—
Confectionery	—	—	—	—
Bread	1	—	—	—
Sauce	—	—	—	—
Farola	—	—	—	—
Ice Cream	2	—	—	—
Pepper	—	—	—	—
Tinned Beef	—	—	—	—
Vinegar	14	—	—	—
Olive Oil	17	—	—	—
Cod Liver Oil	3	—	—	—
Camphor Oil	2	—	—	—
Castor Oil	2	—	—	—
Non-Alcoholic Drink	3	—	—	—
Intoxicating Liquor	111	—	—	—
Liquid Paraffin	1	—	—	—
Baking Soda	2	—	—	—
Baking Powder	2	—	—	—
Florence Cream	1	—	—	—
Bacon	2	—	—	—
Sultanas	1	—	—	—
Sago	1	—	—	—
Custard Powder	2	—	—	—
TOTAL	784	15	14	12

(a) Two prosecutions for adulterated Whole Milk not disposed of at end of year 1939.

The following members of the Garda Siochana acted as Food and Drugs Inspectors in County Donegal during the year 1939 :—

Garda James Meegan, Letterkenny.

,, L. Connolly, Lifford.

,, P. J. Garvin, Newtowneunningham.

,, T. Maguire, Raphoe.

,, J. H. Flanagan, Buncrana.

,, M. Walsh, Moville.

,, P. Harvey, Muff.

,, P. McGurk, Carndonagh.

,, B. Garvey, Ballyshannon.

,, J. Dunne, Ballybofey.

,, J. P. Treanor, Pettigo.

,, A. Sarsfield, Dungloe.

,, P. M. O'Neill, Clogher.

,, W. P. Arnold, Bunbeg.

,, P. Gallagher, Dunkineely.

,, M. Keaney, Mountcharles.

,, D. Brennan, Carrick.

,, E. Gallagher, Milford.

,, T. T. Burke, Creeslough.

,, M. Burke, Falcarragh.

PART II

ANNUAL REPORT

OF THE

County Medical Officer of Health
County Donegal

ON THE

County School Medical Service

YEAR 1939

Annual Report on the County School Medical Service

YEAR 1939

The total number of children examined during 1939 was 5,893 as compared with 4,481 in 1938.

All children presenting themselves for examination were examined in each school visited. Out of a roll total of 13,281 we had therefore 5,893 examined, that is to say 44 per cent. This average figure does not vary much from year to year, and, as already remarked in previous reports, is not of great value, owing to the great variations for different districts in the numbers presenting themselves for examination. On the whole it may be presumed that the majority of absentees are well, as the teacher usually is anxious to bring any defaulters requiring treatment to our notice.

ATTENDANCE OF PARENTS.

Fifty per cent. of parents attended personally at the school inspections. This is a falling-off on last year's figure of 63 per cent., and is to be regretted. Parents are urged to attend with their children, as it allows of more satisfactory contact, and enables the doctor to obtain first-hand information otherwise unobtainable. The presence of a large number of parents makes the conduct of school medical examination a much more trying ordeal for the medical staff, nevertheless this department is anxious to see a 100 per cent. attendance of parents in view of the advantages derived therefrom.

COMMENTS ON TABLES OF DEFECTS.

The percentage numbers of children showing unsatisfactory conditions in matters of Clothing, Footgear and Cleanliness of Head and Body are shown in Table B. The figures for 1939 show no marked difference on those for 1938. The figure of 12.9 per cent. for lack of head cleanliness refers to louse infestation — of varying degree. As remarked in a previous connotation, one louse-infested child may be sufficient to spread the unwelcome parasite to a whole school !

SCHOOL MEALS.

Under the School Meals (Gaeltacht) Act, 1930, hot mid-day meals are provided for Schools in Gaeltacht areas of the County. These meals are very much appreciated, and consist of bread and

butter, plus milk, cocoa, or tea, according to facilities available in any particular district. Milk produced under proper conditions is not available in some districts, otherwise milk would be the dietary of choice in every case.

During the year 1939, £3,385 16s. 3d. was spent in providing food for the pupils of 116 schools in the Gaeltacht with a population of 5,235 children, the average allowance per child being 12/11. The cost of administration of the Scheme was £64 3s. 8d.

URBAN DISTRICTS.

School Meals are also provided by the Urban District Council in Letterkenny and in Bundoran and by the Town Commissioners (whose affairs are administered by a special Commissioner) in Ballyshannon.

Letterkenny.

The Scheme is administered under a special Committee, consisting of members of the Urban District Council, Principal Teachers, and School Managers. The meal consists of a half-pint of milk and and one 4oz. bun, supplied by the Council to contractors, who serve same.

The number of meals served in 1939 was :—

St. Eunan's N.S.	4,171
St. Columba's N.S.	5,008
Barkhall N.S.	696
Robertson N.S.	1,212
Total	11,097

Bundoran.

The School Meals' Scheme was in operation from 8th November, 1938 to 31st March, 1939. The number of school days in that period was 92. A total of 2,135 meals was supplied. The average daily number of meals provided was 23.25. The meal consists of cocoa, milk, bread and butter on Mondays, Wednesdays and Fridays, and hot milk, bread and butter on Tuesdays and Thursdays. The Scheme is supervised by a Committee composed of three members of St. Vincent de Paul Society and the Parish Priest.

Ballyshannon.

The Scheme is in operation in the Convent Schools and in the De la Salle Brothers' (St. Joseph's) Schools throughout the entire year, and the average number of necessitous children in receipt of meals is forty-five.

The food supplied is 4 ozs. bread and margarine and half a pint of pure new milk to each recipient. Pure milk is now supplied in preference to cocoa which had been provided for the first few years during which the scheme was in operation. The milk is heated except during the warmer months.

The meals are prepared and distributed in the Convent Schools by the Sisters of Mercy, and in the Boys' School by the local troop of Catholic Boy Scouts under the supervision of the Principal Teacher. An oil cooker was supplied for cooking purposes in the Brothers' School; in the Convent they had already a coal range in their cookery room. Utensils, etc., were provided in both schools.

8,865 meals were supplied during the financial year ended 31st March, 1939, at a total cost of £56 2s. 11d. The average cost per meal was 1.5672 pence.

"THE OSLO BREAKFAST."

Apart from the provision of milk for school-children there is in progress a development which seems likely to lead to radical changes in the character of the meals given to necessitous cases. In 1936-37 about 140,000 children in England received solid meals, usually in the form of a hot mid-day dinner. This type of meal was introduced after the Act of 1906, when there was not a little semi-starvation among the poorest. It served its purpose, namely, to make good an actual deficiency of food. The position is now quite different, for a hungry child is rare. The income of the family, whether in or out of work, is almost always sufficient to permit the purchase of large quantities of bread. Stomachs are filled, but almost inevitably with the wrong types of food. What a clergyman in the East End of London says about his parishioners serves to describe the poorer people of every industrial town in England to-day: "They live on white bread, . . . the chief food is fish and chips . . . they get very little fruit—it is too dear. The only vegetable eaten is the potato. Oranges are seen only at school treats. The tea-pot is always on the hob."

Badly constituted as are such diets they do at least provide an adequacy of calories. The hot school meal of meat, vegetables

and puddings does not, therefore, provide an appropriate supplement, because although it improves the intake of animal (first-class) protein it is usually defective in respect to vitamins and mineral salts—essentials which are also lacking in the home diet.

An entirely new point of view was presented when an experiment was begun some seven years ago in a school at Kampens, one of the districts of Oslo. Instead of a hot meal of the usual type served at mid-day, the children were given a breakfast composed of foods selected primarily with the object of making good all the deficiencies of the home diet. There were rolls of wholemeal bread to supply the vitamin B and mineral salts lacking in the white bread at home. The deficiency of meat (animal protein) was made good by a hunk of goat's milk cheese and a glass of milk, which also supplied minerals and vitamins. Protection against mild scurvy, which is a very real danger in northern climates where cheap fruit is available only for a short season of the year, was given by a daily allowance of half an apple or orange, a lettuce salad or a raw carrot, depending on the prevailing prices. In addition, there was a good-sized pat of butter to add more of the vitamins A and D. When the child had eaten this meal it was allowed, if still hungry, to fill up with bread and margarine. The experiment proved an unqualified success ; so much so that a similar type of meal has been adopted in almost everyschool in Norway, and is being tried out in the other Scandinavian countries. Both the development of the children and their general health were found to be definitely better than when a hot meal of meat and cooked vegetables was provided.

This simple scheme, which the late Professor Carl Schiotz of Oslo did so much to foster, demands attention, for it seems to offer a simple and effective solution of the major problem of nutrition as seen in Great Britain and Ireland to-day. In Norway, where fruit is rather expensive, it has been found to cost but a fraction more than the hot meal, and it provides no less an intake of calories. A similar scheme could easily be fitted into our existing scheme of providing meals.

The London County Council, impressed by the results obtained in Scandinavia, adopted a modified form of the " Oslo Breakfast " in 1938 in some of their schools. Adapted to the habits of London children this has become the " health dinner," and the ingredients have been modified to suit the national dietary. The meals consist of :—

(1) Salad (lettuce or raw cabbage in winter, tomatoes, carrot, cucumber and salad dressing).

(2) 1½ ozs. of cheese (Cheddar, Caerphilly or Dutch) grated over the salad.

(3) 3 ozs. of wholemeal bread.

(4) ¾ oz. New Zealand butter.

(5) Two-thirds pint of milk, and

(6) A raw apple or orange.

This meal was served daily to necessitous children in one district in the East End of London, and the results compared with those obtained in a neighbouring centre where ordinary hot dinners were served. "The weekly average gains in height and weight were considerably greater in the group receiving the "health dinner"; there was also an improvement in the haemoglobin content of the blood and a disappearance of minor ailments, especially blepharitis."

NUTRITION.

On reference to Table C it will be seen that of all those examined 6.6 per cent. showed malnutrition of moderate degree, while 0.8 per cent. (47 children) showed a marked degree of malnutrition. The corresponding figures last year were 11.9 and 1.5 per cent. It would thus appear that there is a substantial improvement in the general condition of the school children, and it is to be hoped that this improvement may be maintained during the war years.

In the following sections I have outlined some important principles of nutrition. They are specially important for the growing child, and merit particular attention at the present time when the price of foodstuffs tends constantly to rise, without a corresponding rise in purchasing power. It is of importance to have an elementary knowledge of fundamental principles as outlined, so that an attempt may be made by housewives to provide the essential dietary substances from alternative cheaper ingredients than those procurable in times of peace.

FOOD HEALTH AND NUTRITION.

The unfortunate outbreak of a major European war brings the subject of nutrition once again to the forefront of every national policy. Those who lived through the last world-war will have vivid recollections of starving and disease-ridden populations in Central Europe and elsewhere, and will have no desire to see such disasters in the realm of public health again perpetuated. For

this reason, it is important that the principles of scientific feeding and nutrition be as widely disseminated as possible. Hence I feel that there is no need to apologise for the following elementary exposition of some of the fundamental facts concerning nutrition.

One of the most important qualities of a foodstuff is its energy-giving qualities. The human body may be regarded as a complicated and delicately-balanced machine which requires a certain amount of energy to keep it working satisfactorily, and to allow for renewal of worn-out tissue. The food taken in by man is the sole source of this energy, so that it may be taken for granted that without an adequate supply of the right kind of food the human machine will not function properly—in other words a state of ill-health will be engendered. The foods consumed by man vary both in their composition and in their energy-giving qualities and chemists have ascertained that the essential components of food are, in the final analysis, protein, carbohydrate, fat, minerals and vitamins. Most of the ordinary foodstuffs have now been analysed, so that it is possible to tell what percentage of most of the above components is present in any given article of food by reference to tables.

Proteins.

These are complex chemical substances essential for the maintenance of life. It is calculated that between 10 and 15 per cent. of the total energy requirements of the body should be derived from proteins. Any less proportion is insufficient to promote growth and tissue repair. A complicating factor in the utilisation of proteins is that the nutritional value of these substances varies enormously. Proteins of animal origin—as in cheese, milk, butter, eggs, meat—have a higher nutritional value, and are capable of easier assimilation in the body than the proteins derived from vegetable sources—peas, carrots, beans, potatoes, etc.

It is usual to differentiate the proteins into two classes. Those derived from animal sources are termed first-class proteins, whilst those of vegetable origin are relegated to the second class. It is now agreed that 100 grms. of protein will provide 12 per cent. of the total daily energy requirements of the body. It is further considered that the minimum daily requirement of first-class protein should be 50 grm., or half the total protein intake. The other half can be obtained from vegetable sources. (1 ounce weight equals 30 grm. approximately).

Fats.

100 grm. of fat per day is a reasonable ration. Most of this fat should be derived from animal sources.

Carbohydrates.

These include starch and sugar, and form one of the cheapest sources of energy. It is calculated that the daily ration of carbohydrate should be about 500 grm.

Minerals and Vitamins.

A diet may be adequate as regards protein, carbohydrate and fat and yet be incapable of maintaining health or even supporting life in the absence of minerals and vitamins. These are necessary constituents of any diet.

Vitamins.

It is not easy to determine the quantities of these substances necessary for health. Some of them have not yet been isolated and are known only by their effects. The vitamin content of practically all the foodstuffs has been ascertained, and it is known that vitamins A, B, C, and D are essential for growth and maintenance of health. The best safeguard against a shortage of these important food constituents is the ensuring of a varied and mixed diet, and the daily inclusion in it of dairy produce, fresh fruit and green vegetables.

Minerals.

For normal functioning the body requires a constant supply of minerals, the chief of which may be reckoned calcium, phosphorus, iron, iodine and chlorine. Chlorine is practically never deficient, as it is abundant in common salt which is in universal use. Shortage of the other minerals is not uncommon, and leads to definite conditions of ill-health.

Calories.

In order to compare the energy-giving values of foodstuffs, scientists have adopted as a standard the "Calorie." Thus the energy value of a food is usually expressed as the number of "Calories" yielded by each gram of the food. Heat is a form of energy and it has been found convenient to express the energy value of foods in terms of heat units. When we say that 1 gram protein represents 4.1 Calories, this is equivalent to saying that when one gram of protein is completely burnt, it yields up enough heat to raise 4.1 Kilograms of water 1 degree C.

The diet must supply the necessary substances for the growth and repair of the body tissues and energy for the production of

animal heat and muscular work. The human body being in some respects comparable to a heat-machine which converts fuel into Calories, its energy requirements may be estimated in Calories. The fuel or energy needs of the body are satisfied by the fats, carbohydrates and proteins of the diet, the proteins having the additional function of building new tissue for the growing animal, and of repairing tissue wastage in the adult. For these purposes the proteins contained in the animal foods are of better **quality** than those contained in foods of plant origin, the proteins of milk, eggs, and glandular animal tissues (liver, kidney) being especially valuable. Foodstuffs rich in animal protein have sometimes been called body-building foods. The food Calorie, or kilocalorie, is the amount of heat required to raise the temperature of 1,000 grams of water (1 Kilogram) by 1 degree C., and is the unit invariably used in nutritional studies. The Calorie value of a food varies with its composition. Thus 1 gram of protein yields 4.1 Calories, 1 gram of fat yields 9.3, while 1 gram of carbohydrates gives the same number of Calories as an equivalent weight of protein—namely, 4.1 Calories. By means of these figures it is possible to compute the energy value, or Calories, of a given diet, as the relative proportions of fat, carbohydrate and protein in each foodstuff may be obtained from tables. It is calculated that, roughly speaking, an average adult working male has a daily requirement of 3,400 calories. Allowing for the wastage in preparation and digestion, this figure of 3,400 Calories in the food as purchased should allow 3,000 available Calories. This figure is considered by some experts to be possibly on the low side, but it is a safe working estimate on which to base requirements in any individual case.

To criticise the day's food the weight of each foodstuff consumed must be known. The Calorie value per ounce of most common foods may be obtained from charts (see "Food Values at a Glance"—V. G. Plimmer), and thus the total Caloric value is easily computed. In order to ensure that a sufficient quantity of the protein consumed is of first-class quality (animal protein), it is important to calculate from the charts (e.g. in Plimmer) the amounts of protein derived from the different foods consumed.

To sum up, a mixed and varied diet will supply all the requirements for health. Meat, fish, milk, butter, eggs, wholemeal, bread, fresh fruit and green vegetables are important constituents of any diet, and if used in the daily fare, will usually supply all the nutriment required.

ENERGY-YIELDING AND "PROTECTIVE" FOODS.

A useful division of food into two classes has been made—(1)

the protective foods, those chiefly valuable for providing vitamins, minerals and "good" protein and (2) the non-protective foods, chiefly valuable for the providing of energy. Lack of adequate Calories causes starvation, while lack of the protective foods causes a variety of "deficiency" diseases, which may develop despite an abundant Calorie intake.

Among the most important protective foods are the dairy products, especially milk. Then the glandular animal tissues (e.g. liver) and eggs; "fat" fish (herrings, etc.), green vegetables and fresh fruit are also very rich in vitamins and minerals. Finally there are certain fats (butter and cod-liver oil) of special value for providing vitamins A and D. Vitamin D, which is rather scarce in ordinary foodstuffs, is a vital necessity for young children living in temperate climes or in industrial regions where sunlight is scarce, especially in winter.

Prominent among the energy-giving foods are fats, cereals and sugar. The ordinary mixed diet should form a collection of protective and non-protective foods supplying the requisite energy for the body's activity and containing all the necessary protective elements in a correct balance. An unlimited number of different diets could be composed, all of which would fulfil this nutritional ideal. According to the variation in food supply in different climates and under different circumstances, so the problems of correct nutrition will in practice be met by a large variety of food combinations. The "principles" of correct nutrition, however, remain the same.

"Man-Value" for Women and Children.

It is obvious that the Calorie requirements of a small child are less than those of a grown man. Similarly it is found that the energy requirements are less in the case of a woman. The number of Calories required at different ages for male and female have been worked out, and are usually expressed as fractional values of the requirements of an adult male—namely, "man-value" unit. The fraction of unity which represents a child's daily Calorie requirement is therefore known as its equivalent "man-value." Cathcart and Murray have drawn up a scale of such equivalents which is universally used in these countries. From the table it is an easy matter to calculate the total "man-value" of a family. For example, a family consisting of a husband, wife and four children aged 13, 10, 7 and 4 years, has a total man-value of 4.03 namely the sum of 1, 0.83, 0.9, 0.8, and 0.5. Therefore the family requires 4.03 man rations of **Calories** per day. (As already explained the standard man ration is 3,400 Calories per day in the food as purchased).

ENERGY REQUIREMENTS OF FAMILY GROUPS.

Sherman ("Chemistry of Food and Nutrition") says :— "In computing the food requirements of family groups, it has been customary to regard the man as the unit and assume that the food of each child may be represented by some appropriate fraction of the food of the father. This practice naturally arose from the fact that the food requirements of man had been longer studied and were better known than those of children, few investigations having been made upon children by accurate laboratory methods until within comparatively recent years."

But, as the writer has previously pointed out, the food requirement of a man varies so greatly according to his occupation, that it seems hardly logical to make this the basis for estimating the dietary needs of a family. Thus a carpenter may require 3,500 Calories per day, a tailor 2,500; a fourteen year old son of either of these men, 2,800 Calories. With the carpenter as unit, the boy's requirements would be represented by 0.8 of that of the father; but with the tailor as the unit, the allowance of 0.8 would obviously provide far too little food for the boy's needs.

"In practice, the dietitian who makes use of these decimal fractions in computing the food requirements of the family, finds it difficult to avoid the tendency to reckon the child's food requirement according to that of the father, which works serious injustice to the child if the father has a low food requirement because of being engaged in an occupation which does not involve active muscular work. Obviously it is equally inaccurate to assume that the needs of all men are nearly the same, in order that the allowances for the children may approximate uniformity. In our opinion the food requirement of each member of the family should be determined on his own merits rather than in terms of the man's requirement."

It is perhaps not sufficiently widely appreciated that muscular work is much the most important of the factors which raise the food requirements of adults above the basal rate necessary for the mere maintenance of life. One need hardly emphasise the significance of this in the case of men engaged in laborious work involving severe muscular exertion. They require a large quantity of food in order to maintain their health and strength.

Another important factor to remember is that in the case of children the energy requirement includes an additional provision for growth. Boys of 14—17 years may require even more Calories than an average adult, and it is very important that sufficient food be provided for them at this critical age.

THE PROBLEM OF THE BEST USE OF FOOD.

As a result of experiment and investigation it has now been made clear that the average food budget can be easily improved by giving greater prominence to milk, butter, eggs, cheese vetegables and fruit, the money needed for this being obtained if necessary by reducing the expenditure for meat and sweets.

The Food Administration of New York issued as a part of its educational programme, a simple suggested family food budget essentially as follows :—

Divide your money into fifths :—

One fifth, more or less, for vegetables and fruit ;

One fifth, or more, for milk and cheese.

One fifth, or less, for meats, fish and eggs ;

One-fifth or more, for bread and cereals ;

One fifth , or less, for fats, sugar and other groceries and food adjuncts.

The proportion spent on bread and cereals may well vary with the need for strict economy. It must be high in an extremely low-cost dietary, and may be much lower where the level of general expenditure is higher (Carbohydrate is the cheapest form of energy food).

Sherman considers, however, that whatever the level of expenditure it seems wise to observe the two following "rules" :—

(1) At least as much should be spent for milk (including cream and cheese if used) as for meats, poultry and fish, and

(2) At least as much should be spent for fruits and vegetables as for meats, poultry and fish.

The Engineers' Study Group on Economics (London) worked out in 1935 the following **weekly** food budget for an average family of 3.14 man value, e.g., husband, wife and two children aged 8 and 6 years respectively. The cost was worked out to be 9s. 10½d. per head for a week, in 1935. (" Food and the Family Budget," p. 17).

FOOD	Weight lb.	Price London 1935 s. d.	Price Eire February 1940 s. d.
Meat (beef, veal, mutton, lamb, pork, bacon, rabbits, poultry	9	9 0	10 6
Fish	3	1 9	4 6
Bread, white and wholemeal } Flour	15.5	2 10	3 3
Oatmeal, breakfast foods	2	1 0	6
Rice, tapioca, etc	1	3	3
Dried peas, beans, etc	0.5	2	2
Butter	2	2 0	3 2
Lard, margarine, etc.	1	7	8
Milk (15 pints)	18.75	4 6	3 9
Cheese (including cream cheese)	0.75	9	1 4
Sugar	4	10	1 8
Eggs (approx. 12)	1.5	1 6	1 6
Tea, coffee, cocoa	1	2 0	2 8
Potatoes	13	1 1	8
Vegetables	10	2 6	2 0
Fruit	9	4 0	4 0
Miscellaneous: jam, syrup, currants, condiments, etc.	2.75	2 0	2 9
TOTAL	94.75	36 9	43 4

B.M.A. DIET.

The data given in the following diet were derived by combining Diets Nos. 2 and 7 of the Committee on Nutrition of the British Medical Association (B.M.A.). They were taken as representing the requirements of a family consisting of man, wife and two children aged 6—8 years, which is roughly the same size as that envisaged in

the E.S.G. budget. The B.M.A. diets nos. 2 and 7 were designed to secure working efficiency and good health at minimum expense, but to provide more variety than mere subsistence diets. It will be noted that the prices have been worked out on the basis of those current in Donegal, 1940.

Foods.	B.M.A. Diets Nos. 2 and 7 combined.	**Weekly Food Budget.** ("3.03 equiv. men") Prices (**Donegal**) Febry. 1940.
	Lbs.	s. d.
Meat	7.5	8 2
Fish	0.5	0 9
Bread	24.25	5 10
Flour	—	—
Oatmeal, breakfast foods	1.4	0 4
Rice	1.4	0 4½
Peas, Beans, etc	0.9	0 2
Butter, Margarine	0.97	1 6
Lard, suet, etc	0.6	0 4
Milk (10 pints)	12.8	2 6
Milk Condensed	—	—
Cheese	1.4	1 10
Sugar	3.8	1 7
Eggs	0.23	0 4
Tea, coffee, cocoa	1.6	2 8
Potatoes	14.1	0 8
Vegetables, Fruit	7.5	2 6
Miscellaneous	2.3	2 4
TOTAL (Lbs.)	80.65	31 10

Average cost—10s. 6d. per head.

DIETETIC ADEQUACY OF THE E.S.G. DESIRABLE FOOD BUDGET.

The dietetic adequacy of the E.S.G. food budget is confirmed by the views and findings of the B.M.A. Committee on Nutrition, 1933, which are briefly as follows :—

(1) An adult man engaged in work that is not physically strenuous requires the food-equivalent of 3,000 Calories a day.

(2) Allowing for wastage in preparation and digestion, the daily food as purchased should have a value of 3,400 Calories.

(3) The weights of the food components, in proper balance, to give these 3,400 Calories should be, approximately, in grams :—Proteins 100 ; Fat 100 ; Carbohydrate 500.

(4) For health and working capacity the inclusion in the dietary of adequate quantities of vitamins and minerals is essential.

The B.M.A. Committee does not regard the 3,400—3,000 Calories per man per day as constituting a minimum or an optimum, but as a safe all-round estimated requirement. It would certainly be inadequate for a man or a youth engaged in heavy, physical work.

BREAD.

Regarded as human food the wheaten grain ranks first in these Islands. Ground into flour, it constitutes the basis of our bread and the various productions of the pastry-cook.

The Wheaten Grain.

The wheaten grain (berry) consists of (1) the germ containing the embryo, (2) the endosperm, which provides nutriment for the embryo, and (3) the protective rind or bran. Enclosing the whole is the husk which is separated as chaff in the act of threshing.

(1) The germ, which constitutes 1½ to 2 per cent. by weight of the entire grain, contains, besides the embryo, fat which is apt to turn rancid ; the germ also provides ferments capable of digesting the nutriment material of the endosperm and rendering it suitable for assimilation by the embryo. For these reasons it needs to be eliminated, if the flour is to be kept more than a short time. This could not be done by the old crude method of stone-grinding, but is readily accomplished by the more recent method of steel-roller milling.

(2) The endosperm contains 70 per cent. by weight of the grain ; it varies in composition in different species of wheat ; and differs in composition from within outwards. The outer part, rich in protein, yields baker's or household flour, the central part, poorer in protein, yields "patents" ; and these varieties can be separated by steel-roller milling. Semolina consists of the central part of hard wheats such as the Hungarian.

(3) The bran or protective rind contains much dense cellulose and a high percentage of minerals. It is very resistent to disintegration, whether in the digestive tract or in the soil, where it is necessary to keep the grain intact until the embryo is capable of fending for itself. The bran consists of an outer "flinty" readily detachable layer, known as bees-wing, and an inner layer containing cells laden with pigment, to which the colour of brown bread is due.

Special mention must be made of the layer of large cells, rich in the protein known as aleurone. This layer generally comes away with the bran, but belongs more properly to the endosperm, constituting its outermost portion.

Wheaten Flour.

By the older crude methods of stone-grinding the bran alone is separated, leaving the whole remaining portion of the grain, including the germ, for which reason the bread made from stone-ground flour cannot be kept long without becoming rancid. With the addition of a small quantity of the inner pigmented layer of the bran, this stone-ground flour constitutes the original wholemeal brown loaf.

Steel-roller milling is a product of the industrial age ; by means of parallel pairs of cylindrical steel rollers, rotating at different rates, and at a distance from one another capable of being graded to a nicety, it is possible not only to separate out the germ as well as the bran, but to mill the endosperm into a variety of different flours.

The bran does not, like the endosperm, admit of being ground into fine powder, even by means of steel-roller milling, which however is more effectual in this respect than stone-grinding.

" The more refined flours have yielded a multiplicity of culinary products—spongy breads, buns, scones, tea-cakes, sponge-cakes, swiss-rolls, and the like ; a variety of pultaceous puddings and an endless assortment of pastries—all characterised by the common property of demanding little exercise of the teeth and jaws, and having the further disadvantage of forming in the mouth a soft, non-detergent, sticky mass (intensified, perhaps, by a rich admixture of sugar)

which clings to the teeth. the more so that it fails to excite the mouth-cleansing activities associated with vigorous mastication. The refined flours are chiefly responsible for our ill-developed jaws and the abundance of dental caries among us." (Campbell).

Brown Bread.

The original brown bread was made from wholemeal minus the bran, to which was added a sufficiency of the bran to give a brown colour. The various brown breads in these Countries approximate in varying degrees to the wholemeal type. In the United States wheaten flour is accepted as wholemeal if no more than one-tenth of the entire grain has been removed.

Since the advent of industrialism baker's bread has undergone steady deterioration so far as the health of the jaws and teeth is concerned. Our soft, spongy, highly-watered, ill-baked wheaten bread, made of roller-milled flour, is swallowed after a perfunctory chewing and insalivation ; in consequence, the full flavour of the wheat berry is not experienced, its digestion is prolonged, the teeth and jaws are inadequately exercised and the mouth tends to be left dirty.

Our loaves are unsufficiently baked, they contain an excess of water, too little crust, and are too spongy in texture. In order to obtain a "maximum of crust, loaves should be spindle-shaped, cylinder-shaped, or bun-shaped." Such loaves, made of suitable flour, and well baked, give the jaws, teeth and salivary glands the exercise they crave for. Ill-baked new bread is more sticky than when stale, and more apt to be swallowed after perfunctory mastication, and to cause indigestion, but well-baked, crusty bread, compelling vigorous mastication, can be eaten with impunity almost hot from the oven ; with a liberal supply of good butter it constitutes for the growing human a healthy and tasty food.

Bran.

Bran, together with the aleuron layer of cells, constitutes ' offal," which is a valuable food for poultry and farm animals.

In this country, wheat is the national cereal food. The ideal form for wheat consumption is well-baked bread made with standard flour (contains from 80 per cent. of whole wheaten flour downwards).

NUTRITIVE VALUE OF RAW AND PASTEURIZED MILK.

Five years ago the Milk Nutrition Committee planned a series of experiments to find out as definitely and as authoritatively as

possible whether any real difference existed between the nutritive value of raw and pasteurized milk. Three reports have already been issued. The first deals mainly with observations on rats, and the third with observations on calves. The second was an interim report describing the effects of dietary supplements of raw and pasteurized milk on the growth and health of school-children. The fourth and last report, which is just published, completes the second, and furnishes a summary of the results of all the experiments together with the conclusions to be drawn from them. *

The observations on school children were intended to provide not only a comparison of the relative values of raw and pasteurized milk but a justification of the milk-in-schools scheme. It was desired, in fact, to obtain some quantitative estimate of the beneficial effect of a milk supplement to the diet of growing children. Altogether 8,435 children, aged 5 to 14 years, distributed in five centres in England and Scotland, participated in the test. They were taken by classes and divided at random into four groups, the first of which received biscuits of very low nutritive value, the second one-third of a pint of pasteurized milk, the third two-thirds of a pint of pasteurized milk, and the fourth two-thirds of a pint of raw milk. The supplements were given during school hours for a year, excluding Saturdays, Sundays, and holidays. At the beginning, at the end, and twice in between, the children were examined medically by specially trained observers. The material for the present report was taken from 6,097 children who attended all four medical examinations, and from 695 who attended the first and second. Briefly, it was found that the milk supplements produced in both sexes, irrespective of age, increments in height, weight, and chest circumference greater than those which occurred in the control group on biscuits. These increases were greater in the groups receiving two-thirds of a pint of milk than in those receiving only one-third of a pint, but the absolute increases were very small. Thus in the boys the average increase in the height of the two groups receiving two-thirds of a pint of milk over the biscuit group was only 0.089 inch, and in weight 0.584 lb., while in girls the corresponding figures were 0.088 inch and 0.913 lb. The growth-promoting power of the milk appeared to be exerted mainly in the early part of the test, and contrary to expectation was greater in children who were assessed clinically as above the average than in those who were poorly nourished at the start. Assessment of the posture, the complexion, and the condition of the tonsils, the

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*Milk and Nutrition: New Experiments Reported to the Milk Nutrition Committee. Part IV. Price 2s., post free, from the National Institute for Research in Dairying, Shinfield, Reading.

conjunctivae, and the eyes yielded irregular results, there being a downward shift during the course of the experiment. The committee attributes this to an alteration in the standard of the medical observers. On the other hand, they attach significance to an almost equally subjective test—namely, the general state of nutrition, which was found to rise in the groups receiving milk to a greater extent than in the group on biscuits. Similar weight is given to the greater increase in intellectual capacity among the milk groups during the course of the year as estimated by the teachers. What exactly is meant by intellectual capacity it is difficult to say. If the expression refers to innate intelligence, which is doubtful, it should have been possible to measure it by proper intelligence tests. If mere increase in mental alertness and animal spirits is intended, then the subjective element in assessment comes in again, particularly when it is realised that the teachers, unlike the medical examiners, knew to which group the individual children belonged. On the whole, the results of these various subjective tests are difficult to interpret, and too much stress should probably not be laid on the committee's conclusions.

So far as a comparison of raw and pasteurized milk is concerned no constant differences could be detected between the growth-promoting effects of the two-thirds of a pint of raw and two-thirds of a pint of pasteurized milk in either height, weight, or chest circumference. The only constant difference that could be established was in muscular strength, as estimated by the dynamometer test, and this was in favour of pasteurized milk. The differences, though uniformly in the same direction, were small, and could not be considered statistically significant. The general conclusions to be drawn from the feeding test on children are that milk has a stimulating effect on growth, and that there is no detectable difference in this respect between raw and pasteurized milk.

Summarizing the experiments on rats, the committee draws the following conclusions. Commercial pasteurization did not affect the total nutritive value of the milk or the availability or nutritive value of the protein, calcium, or phosphorus; it reduced the vitamin C content of the milk by about 20 per cent. and the vitamin B complex—presumably the B_1 fraction—slightly, but did not alter the content of vitamin A or of its precursor, carotene. The effect on vitamin D was not tested, but as this vitamin is known to be very resistant to heat it may be presumed that it is not affected by pasteurization. The fall in vitamin C content occurs only, it will be remembered, when the milk has been previously exposed to light. Pasteurization of milk drawn into and kept in opaque vessels free from copper has no effect on vitamin C. The calf-feeding experiments again failed to reveal any significant difference between the nutritive value of raw and pasteurized milk. In relation to the observations

on children and calves, it may be argued that there were defects in the pasteurized milk, but that they were neutralized by other foods. The committee's answer to this is that it is not small defects which are important but only those which become manifest under strictly practical conditions. Such defects might be of importance in infants fed purely on cows' milk, but since cows' milk is not a perfect food for infants it is usual now to add iron and vitamin C, even when the milk is given raw. Since the best way of giving iron is in the form of egg-yolk, and since egg-yolk contains in addition vitamin A, carotene, vitamins B_1, B_2 complex, and D, any slight defects in pasteurized milk which might exist would almost certainly be neutralized by this means.

The main result, therefore, of the research work carried out during the past five years by the Milk Nutrition Committee on rats, calves and children is to show that milk has a stimulating effect on growth and that no detrimental effect of any practical importance is brought about by holder pasteurization. The conclusions of such an authoritative body, taken in conjunction with similar conclusions by other independent workers in different parts of the country, will, it is hoped, dispose once for all of the erroneous statement that pasteurization destroys the nutritive value of milk. At a time such as the present, when large numbers of children who have been brought up on pasteurized milk in our large towns are now being fed on raw infected milk in the country districts, the importance of safeguarding their health by adequate heat treatment of the milk cannot be too strongly emphasised. Medical officers who have hitherto hesitated to introduce pasteurized supplies from the neighbouring towns on account of a lingering fear that the nutritive quality of the milk was less than that of raw milk may take courage from the fact that such a fear is entirely without scientific foundation.

Agencies and Methods to Improve Nutrition.

In most countries of the civilised world there exists to-day a system of public and quasi-public agencies for the improvement of popular nutrition. The organisation and activities of these agencies are reviewed in the first section of the present chapter. The second section summarises what has been done by workers and employers to promote rational dietaries. Finally, the co-operative movement commands attention for its activity in this field.

1—PUBLIC AND QUASI-PUBLIC AGENCIES.

The work of public and quasi-public agencies in the field of nutrition is now the subject of an extended inquiry by the Mixed Committee on Nutrition of the League of Nations. In view of this

fact the present Report is restricted to a brief sketch of the organisation and activities of such agencies and of recent tendencies in their work.

ORGANISATION.

In most countries the primary or exclusive public responsibility for promoting rational nutrition is lodged with a particular executive organ of the State ; e.g., the Ministry of Health in Great Britain, the Department of Public Health in Mexico, or the Public Health Service in Denmark. In some instances, usually with special emphasis upon the nutrition of school-children, the Ministry of Public Education also shares in the responsibility (Great Britain, Urugnay). In other instances, and with a particular view to the nutrition of unemployed persons on relief, specialised agencies of the State are at work (e.g., The Labour Fund, in Poland : the Federal Emergency Relief Administration, in the United States of America).

Sometimes the promotion of nutritional well-being falls within the competence of the Ministry of the Interior (Italy) or of the Ministry of Agriculture (Finland) or of the Ministry of Social Assistance (Austria). And in at least one country (United States of America) nutritional problems are handled by a number of federal establishments.* which act jointly with State and municipal bodies.

Regional, district and municipal authorities are also concerned with nutrition in close alliance with the central organs of the State. These authorities include local boards of health, school health inspection systems, bodies to regulate foodstuff supplies and retail markets, school authorities to the extent to which they are responsible for instruction in domestic economy, etc. Organisations to disseminate information on the consumption of particular foods—milk, butter, fruit, meat—are also active. Institutes of nutrition research join in the work by popularising the results of dietetic science.

No sharp line divides the public agencies for promoting rational nutrition from the quasi-public agencies. By quasi-public agencies in the present context are meant medical associations, the Red Cross, missionary societies, social welfare services, organisations to provide the poor with milk, etc. Where official public organs exist, the two groups of bodies lend one another mutual aid and support, for they seek the same ends by similar means. Where no official public organs are in the field, the quasi-public agencies carry forward on their own account. *

ACTIVITIES.

Speaking broadly, the public and quasi-public agencies for improving nutrition engage in three main types of activity. First,

*Bureaux and services attached to the Departments of Agriculture and Labour ; the Federal Emergency Relief Administration ; the U.S. Public Health Service, and others.

they try to maintain the purity, soundness and wholesomeness of the public food supplies and exercise supervision over retail food markets. Second, they minister directly to the nutritional needs of special groups of the population, such as expectant and nursing mothers, infants, school-children, and unemployed households. Third, they engage in education and propaganda with a view to reshaping dietary habits along more rational lines.

1. Food Supplies and Markets.

There is no civilised country which does not possess public agencies charged with the duty, inter alia, of enforcing pure food laws. The functions of these agencies consist in inspection, analysis, condemnation, seizures, etc., and control is exercised over such essential foodstuffs as milk, meat, fruit, vegetables, as well as canned foods of all sorts. The International Institute of Agriculture has, since its creation, followed closely the development and extent of pure food legislation, and has put at the disposal of the International Health Bureau at Geneva a survey of the subject which has been printed by the latter body. No attempt is made here to evaluate either the adequacy of these laws or the success with which they are enforced.

In a few countries, some efforts have been made toward regulating retail food prices in the interest of consumers as well as producers (e.g. Czechoslovakia, Great Britain). The spread in prices between what the farmer receives and what the consumer pays, has been the subject of innumerable official inquiries. Government organs to bring about lower food prices have been established in a number of countries.

Municipal authorities everywhere have regarded it as their duty to regulate outdoor markets, and to subject shops where food is sold to sanitary control. In many communities, public markets have been established. The regulation and establishment of food markets have been in part inspired by the desire to keep prices at reasonable levels, in part by the desire of assuring minimum standards of quality in the public food supplies.

2. Nutritional aid to special groups.

The protection of mothers and infants constitutes the basis of nutritional hygiene. In most countries, the nutritional needs of pregnant women, nursing mothers, and infants are the special concern of public and quasi-public agencies. The specific applications of the general principle vary from country to country and from district to district, the emphasis being either on maternity clinics, day

nurseries and crechcs ; or on maternal canteens and milk dispensaries ; or on actually providing food ; or on dietetic instruction.* Whatever the variation in its specific applications, the general principle always remains the same : that economic factors should not be permitted to endanger the health of the coming generation and that during the most critical nutritional period at least, both mothers and children must be rationally nourished.

By a natural transition, concern with the proper nutrition of infants passes into concern with the proper nutrition of school-children. School age, like infancy, is a critical phase in the nutritional life history of human beings. If economic factors—the income status of parents—were allowed free play during this period, large numbers of the growing generation would suffer in their physical and mental development. In fact, the system of agencies for ministering to the dietaries of school-children is much more extensive, in most countries, than that for ministering to the dietaries of children of pre-school age. School meals are one of the oldest of public health institutions.

In most countries, it is the State itself, as a rule, which undertakes to meet the charges of providing school meals. Children from very poor families are provided with their meal or meals (breakfast frequently ; lunch almost always ; dinner in a few cases) free of charge. Children from households with more ample resources pay modest or even nominal charges. In fact, the belief is gradually making headway that all children, irrespective of their parents' economic status, should enjoy free meals at school. To justify this belief, it is argued that the purpose of free school meals is not to grant charity, but to promote health.

The distribution of fresh, pure milk to school-children is the simplest and most usual form of meals at school (Great Britain, the United States of America, and Switzerland, among other countries, are prominent in providing school-children with milk, either free of charge or at nominal cost). Hot soup, meat, vegetables, bread, sweets, and fruits are also supplied. At schools where the meal is elaborate, it is often served in school canteens or in school kitchens (canteens and kitchens of this sort are highly developed in many Swiss municipalities, and also in the large cities of Belgium. In all cases, the aim is not merely to provide the children with something to eat, but rather to provide them with protective foods (milk, fruit)

*Some of the countries where provision for the nutritional needs of mothers and infants is most highly developed are : Belgium, France, Italy, Great Britain, United States of America, Union of South Africa, Union of Soviet Socialist Republics, Switzerland.

and with well-balaneed diets. It may further be noted that, in Oslo (Norway) experiments have been earried out on a wide scale to find out what is the best type of school meal. In a certain number of eountries, homes for apprentiees have been set up by State initiative, with a particular view to the welfare of boys spending the time of their apprentieeship far from the homes of their families. In these homes speeial attention is given to the diet of the apprentices aecommodated.

Public and quasi-public agencies for improving the nutrition of adults in general are not highly developed. Nevertheless it may be noted that Governments have been eoncerned in recent years with improving the standards of nutrition of these groups of the population whose feeding is provided eollectively and at State expense. Foremost among sueh groups are the armed forces, and eonsiderable attention has been given recently to the problem of establishing the dietary of soldiers upon a rational basis in practically all eountries.

Simple arrangements for furnishing regular or occasional food supplies to the indigent poor are also a eustom of long standing in many eountries. Thus there are agencies for distributing Christmas baskets, for providing "Winter Aid," for organising soup kitchens, for maintaining transient shelters, etc. For the most part, the work of such agencies is eonfined to very special groups : the old, the feeble, the ill, the disabled, the homeless.

During recent years, however, and in response to the exigeneies of the world wide depression, a mueh more significant praetice has emerged. Publie and quasi-public agencies have undertaken to safeguard the nutrition of unemployed households on relief. They have undertaken to do so by a variety of means : the regular provision of food grants or of free meals ; the issuance of vouchers good for the purchase of merchandise in grocers' or butchers' stores ; dietary instruction in eonnection with cash relief, etc.

Speaking broadly, every relief payment to an unemployed worker's household may be regarded as a grant in aid of his family's nutrition. Among low income families, it is well known, very high proportions of the total income have to be devoted to the purchase of food. When income diminishes materially, or ceases entirely, the quantity, quality and diversity of the diet are likely to suffer at onee. In many countries, moreover, cash relief has been supplemented by food grants, or food grants substituted in part for cash Thus directly and indirectly the relief organisations have funetioned as agents for maintaining standards of nutrition among the large masses of working class families who, in all countries, have felt the impact of the depression with particular severity.

3. Education and Propaganda.

Education of the public in rational nutrition is the most characteristic activity of the public and quasi-public agencies considered here. From many points of view it is the most important single function that they have to perform. Even the most doctrinaire defenders of " laisser faire " in economics would not maintain the Government intervenes improperly when it educates all consumers—workers, salaried employees, civil servants, farmers, small entrepreneurs, and even persons higher up on the income scale—to understand the choice and preparation of foodstuffs, the dietetic values of various nutriments, the most frugal manner of budgeting family resources, the least wasteful and destructive procedures of cooking and serving, the bad effects of monotonous diets, of badly prepared meals, of hastily consumed lunches and dinners, of insufficient quantities of calories, proteins or the essential vitamins. Education in these matters merges into propaganda, for it aims at the positive reshaping of dietary habits. Propaganda, in its turn, takes on the character of education ; for it disseminates a considerable mass of knowledge.

Almost all agencies for improved nutrition engage in education and propaganda : sometimes as their main task, in other instances as a subsidiary activity. Such educational and propaganda work has assumed a diversity of forms. Books, pamphlets, and guides are published. The results of scientific research are popularised. Public lectures and radio broadcasts are given ; conferences and expositions are held. Domestic economy is taught in the primary and secondary schools. Universities and colleges undertake the professional education of dietitians and nutritionists. Nation-wide campaigns to popularise the consumption of milk, fresh fruit, or fruit juices are launched. Advisory services are attached to hospitals, clinics and public welfare agencies.

In five countries at least, the machinery of education and propaganda is particularly elaborate. These countries are the United States of America, Italy, Great Britain, Switzerland, and the Union of Soviet Socialist Republics. Belgium, Denmark, France, Japan and Czechoslovakia are some of the other countries where education and propaganda are being pursued extensively and in an organised manner.

RECENT DEVELOPMENTS.

A variety of forces have been at work during recent years to multiply the number and increase the scope of public and quasi-public agencies for improved nutrition.

First, continued unemployment has, in almost all countries

focussed public attention sharply on the standards of living and of health which prevail among families at the bottom of the income scale.

Second, public attention in popular nutrition has been rendered still more intense by the paradox of abundant food supplies on the one hand and widespread hunger on the other.

Third, the efforts of educators and propagandists have gradually stirred up a growing popular interest in the scientific aspects of diet and nutrition.

Under the influence of these forces, not only have public and quasi-public agencies for improved nutrition increased in number and expanded in scope ; but there has developed a tendency in some countries toward the evolution of co-ordinated national systems for dealing with nutrition problems (e.g. Great Britain, the United States of America, Italy, Mexico, Uruguay). One of the most interesting manifestations of this tendency is the official statement by the Government of France, on 22nd February, 1936, announcing the creation of a National Committee for Nutrition Research. The Committee has since delegated the work of preparing its studies to four expert committees : (1) A Scientific Committee ; (2) a Committee on Teaching and Practice ; (3) an Economic Committee ; and (4) a Committee on Food Control.

PROTECTIVE FOODS, MINERAL AND VITAMIN REQUIREMENTS

In part II of the London Report, stress is laid on the need for protective foods. These are expressed in everyday terms as milk, butter, cheese, eggs, meat, potatoes, fresh green vegetables and fresh fruit. Sunlight is also reckoned as a protective nutritional agent, because it generates vitamin D in the organism.

MILK.

The need for milk in the human dietary—The use of the milk of cows and other mammals in the diet of the human race is as old as the history of mankind, and during the long ages in which it has been thus used its value has ever been highly esteemed. A land " flowing with milk " was the ideal of pastoral tribes in ancient times and will still remain the ideal, if the correct nutrition and health of the people receive due consideration.

The value of milk is well demonstrated by a survey of the dietary habits of the different native races inhabiting the world. Fine physique, good health and virility are usually seen in races where

milk has an important place in the diet, as, for example, amongst the Arabs and other races inhabiting South-Western Asia and South-Eastern Europe. The contrast in health, strength and stamina is proverbial between the Hill tribes of India, who partake largely of milk, and those dwelling in the plains, where the diet is more exclusively vegetarian and consists largely of cereals.

Modern scientific research has entirely confirmed the empirical conclusions drawn from human experience as to the dietary value of milk. Milk, which is designed to afford complete nutrition to the mammalian young, is known to contain all the factors needed for satisfactory nutrition, combined in a suitably proportioned mixture of —

(1) Protein of good quality,

(2) Fat,

(3) Carbohydrate,

(4) Mineral Salts,

(5) Vitamins.

In this respect, milk is the nearest approach we possess to a perfect and complete food, and no other single food is known that can be used as a substitute. If this had not been so, milk would long ago have disappeared from the dietary of civilized peoples, especially of those dwelling in cities. For milk is not only the most nutritious, but is also the most inconvenient, **and at times may be a dangerous foodstuff.** For its high nutritive value makes it also a perfect medium for the growth of other organisms, including bacteria. In other words, milk will not " keep," and an elaborate organisation is needed to bring it regularly to the consumer in a fresh condition. Apart from the bacteria concerned with the " natural " processes of souring and putrefaction, **milk may also act as a vehicle for the spread of germs of definite disease, such as tuberculosis, diphtheria, typhoid and scarlet fevers.** The reason why, in spite of these drawbacks, we continue to include milk in our diet is because its value is unique. Evaporated milk, dried whole milk and dried skim milk are more economical than fresh milk and have been found extremely useful in areas with inadequate dairy herds—where the quality of the fresh milk used in their production has been properly safeguarded.

It is true that it is possible to secure a fully adequate diet, except in infants and young children, without the inclusion of milk. This is shown, among other examples, by the physical perfection of the

peoples of certain islands of the Pacific when they lived under primitive conditions. They ate a wide variety of vegetable foods, supplemented with fish, turtles, shell-fish, etc. But such foods as were available to them were not available to people subsisting on the agricultural products of Europe and the Americas. In these geographical areas, the products designated as protective foods must be made available in greater abundance for the protection of health.

Another reason why the importance of milk is stressed for these populations is that milk production on a large scale is economically sound in large areas, not only because of its unique value as a food, but also because dairying conserves soil fertility to a greater degree than do most other types of agriculture.

The nutritive value of milk—(I) The proteins contained in milk, lactalbumin and casein possess a high nutritive value, since the amino-acids of which they are composed make them especially suited to supply the requirements of growth in the young, as well as of maintenance in the adult.

(II) The carbohydrate is present in milk in a soluble form, as milk-sugar.

(III) The fats of milk are present in an emulsion of different fats of low melting-point. Milk-fat, when separated as butter, is the most digestible and acceptable fat known to us and is a source of the vitamins A and D.

(IV) Minerals : Cow's milk is one of the foods richest in salts, especially in calcium salts and phosphates. These two minerals are essential constituents of every cell in the body, so that an adequate supply is necessary for the maintenance of health at all ages. The amount of lime in cow's milk (1.5—2 parts per 1,000) is only equalled by that contained in some green vegetables. In milk, however, the lime salts are present in a form specially easy of absorption.

(V) Vitamins : While the nutritive value of cow's milk depends to some extent on the diet and management of the cow, yet the nature and proportion of the protein, carbohydrate, fat and salts it contains are maintained with remarkable constancy over a wide range of variation in the type of feeding adopted. There is, however, more variation in the vitamin content, and the highest value in this respect is only found in the milk of cows which are exposed to the rays of the sun and fed on their natural diet of fresh green herbage—i.e., on pasture in the summer; nevertheless, winter milk remains a valuable foodstuff in this respect. It is true that the amount of the antirachitic vitamin D, so essential for the growing child, is much reduced in winter milk.

Vitamin D, however, whose physiological function is to secure the retention in the body of the lime salts and phosphates ingested in the food, acts with much greater economy when these salts are present in abundance in the diet. In many climates in the winter, therefore, when, owing to the lack of sunshine, the growing child is unable to synthesise Vitamin D for itself, an abundant supply of milk is specially needed, for the salts thus supplied will enhance the action of the diminished amount of Vitamin D present in the milk and other articles of food.

The composition of the proteins of milk makes them specially adapted for the support of growth in young organisms and gives them a definite supplementary action towards those of cereals, which are inferior in nutritive value. Milk, it is recommended, should represent a large proportion of the diet at every age. The report of the Technical Commission of the League of Nations approved the tendency displayed in certain countries to increase the consumption of milk to as much as one litre* per day for pregnant women and nursing mothers, and to provide a comparatively large quantity for infants, children and adolescents. For these classes, it strongly recommends free or cheap milk distribution. It calls attention to the nutritive value of skim milk, which, although it has lost its fat and fat-soluble vitamins, retains many other valuable nutrients. It therefore deplores the way in which this valuable food is wasted in many countries. Of other milk products, cheese retains the proteins of milk, a large proportion of the calcium salts and vitamins, while butter is the most nutritious fat in the modern dietary.

EGGS.

Eggs are important as a source of good protein and of valuable minerals, including iron; the fat contained in the yolk is a rich source of most vitamins, especially of the B vitamins, also of the antirachitic vitamin D, which is otherwise sparsely distributed in foodstuffs.

MEAT.

Meat has a special value as a source of protein and iron. Its popularity is chiefly due to its appetising and stimulating properties; but, from the nutritional point of view, the protein of ordinary muscle meat is inferior to that of eggs or milk. The glandular tissues, on the other hand—liver, kidney, sweet-bread (pancreas)—are among the most highly nutritious foods we possess, as regards the character of the protein, the mineral and vitamin content. They are also rich in a substance which stimulates the formation of red blood-cells in the bone marrow.

*(1 gallon equals 4½ litres).

GREEN AND LEAFY VEGETABLES.

Green leafy vegetables are rich in the B vitamins and in vitamin A; they are also among the richest sources of the antiscorbutic vitamin C. Since this vitamin is sensitive to heat, the dietary value of uncooked salads is obvious.

The abundance of minerals and vitamins in green vegetables and the special character of the protein, although present in small quantities, make them of great value, especially as supplementary foods to a diet containing cereals. Just as among pastoral communities the defects of a cereal diet may be corrected with milk and dairy products, so, under other circumstances, correction can be obtained by green vegetables. In the densely populated regions of Southern China, for example, where animal foods cannot be raised, the deficiencies of rice diet are largely repaired by the abundance of vegetables eaten.

FRUIT.

The special nutritive value of fruit depends on high vitamin C (ascorbic acid) content. Different fruits vary greatly in their vitamin C content, the richest being citrus fruits (e.g. oranges and lemons). Tomatoes are also valuable; grapes are relatively poor.

Vitamin C is readily destroyed by heat, so that fruit jams and preserves generally contain none. It is probable that preserved fruits, however, may possess a dietary value due to their mineral content. Oranges, again, are rich in calcium salts, while grapes are rich in iron, and fruits generally may have a special value in supplying mineral constituents to those on otherwise restricted diets. Fruits having a yellow colour—e.g., oranges and tomatoes—are often useful sources of vitamin A owing to their carotene content.

COD-LIVER OIL AND OTHER FISH-LIVER OILS.

The importance of cod-liver oil was stressed in the report of the Technical Commission as a source of Vitamin D for infants and growing children, especially for those living under climatic, seasonal and social conditions where sunshine is limited. It is also a valuable source of iodine and vitamin A. Cod-liver oil contains 85 to 100 international units of vitamin D per gramme. The liver oils of the halibut, tuna and of the percomorph fishes (of which the perch is the common type) contain extraordinary quantities of the vitamin. The percomorph liver oils contain as high as 100,000 I.U. per gramme. Although these oils are much less abundant than cod-liver oil, their high potency in vitamin D makes them effective in very small doses, and they are important sources of this nutritive factor. (I.U. equals international units).

ENERGY-BEARING FOODS.

The report of the Technical Commission sets out some specimen diets for various age-groups up to the age of 5 years and for mothers. In these, the report so arranged the protective foods as to yield approximately 1,400 calories per head without the inclusion of any cereals, fats or sugar. These would have to be added, as required to satisfy the energy requirements of any individual, as distinct from his essential mineral and vitamin requirements.

In the general recommendations in its report, the Technical Commission emphasised the following views :

> " Although a simplified diet may be so constituted from a few protective foods as to be satisfactory, it is a general principle that **variety in diet tends to safety,** provided it contains a sufficiency of the protective types of food materials."
>
> " White flour in the process of milling is deprived of important nutritive elements. Its use should be decreased and partial substitution by lightly milled cereals, and especially by potatoes, is recommended. The consumption of an excessive amount of sugar is to be condemned, and in this case also partial replacement by potatoes is urged."

It will be noted that the report of the Technical Commission recommends the modification in many countries of the proportions hitherto occupied in dietaries by the three foods named.

CEREALS.

Cereals form a most convenient and acceptable food of high energy value and for centuries they have been the stable food of the great Asiatic and Mediterranean civilisations. Their value is self evident ; but in Europe especially, partly because of the increased availability of protective foods, their consumption has tended to diminish, except under conditions of heavy manual labour or because of limitations in income. At the same time, cereals are being consumed more and more widely in a highly milled form. The report suggests that bread should be made more protective by restoring to the flour, as far as possible, the special nutritive principles contained in the husk and germ of the grain, particularly the vitamin B group. This recommendation, issued at a moment when the question of different kinds of bread is being discussed in every European country, is of great importance both for economic as well as for hygienic reasons.

SUGAR.

In the last thirty years, sugar has become one of the cheapest forms of calories and the consumption has increased manifold in

many European countries. In the United Kingdom, it has been estimated that a five-fold increase in average consumption has taken place during the last hundred years. Refined sugar, like highly milled cereal products, provides energy without any protective elements. An excessive proportion of sugar in the diet is especially bad for children, whose instinct to eat it seems altogether out of proportion to its nutritional qualities, since it occupies the place which should be filled by protective foods.

POTATOES.

Special attention is called to the value of the potato which, as a food rich in calories and starch, is particularly suited to substitute sugar and cereals in the modern European diet. The introduction of sugar and white flour to populations in remote districts has been followed by the occurrence of dental disease previously unknown. Examples are found among the inhabitants of Iceland, among Esquimo and native Indian tribes in Alaska and Western Canada and among the races inhabiting Northern Scandinavia. A large proportion of potatoes in the diet encourages no such predisposition to dental disease as is the case with cereals ; populations showing relative freedom from dental disease with high consumption of potatoes are found in certain islands of the Hebrides, in rural Finland and in Poland, and in Tristan da Cunha, in which island at the present time potatoes form a large proportion of the dietary, and dental caries is a rarity. Potatoes are also a valuable source of iron and vitamin C, and one of particular value, because they retain a high proportion of their vitamin C content after cooking.

NUTRITION AND AGRICULTURE.

As the present movement towards better nutrition spreads and grows, certain adjustments will be called for in national agricultural systems. Diversification of diet involves diversification of agricultural production. As the highly protective foods (dairy products, fruit and vegetables) tend to constitute a large proportion of the national diet, in countries where the general level of consumption is already relatively high, there will be a tendency to shift from the production of the staples to the production of these foods. Many of them, such as liquid milk and some fruits and vegetables, cannot, owing to their nature, enter largely into international trade ; and all national agricultural systems are consequently likely to be directly affected by the changing structure of domestic demand.

The commodities with an upward trend of consumption are, characteristically, high-value goods. Per unit of land used or per unit of capital invested, they bring a higher return to the producer

than the foods of high energy value. This is particularly the case wherever the greater part of the agricultural land is held in small holdings ill adapted to mechanised low-cost methods used in the production of cereals on the extensive holdings of the non-European countries. These small holdings are, on the other hand, very well adapted to animal husbandry and the more intensive cultivation of fruit and vegetables. Soil fertility is, moreover, increased through the farmyard manure which forms an important by-product of animal husbandry.

The diversification of production which would result, and has already resulted, from national agricultural systems adapting themselves to the new consumption trends not only involves a concentration on higher-value crops ; equally important is the fact that it involves the spreading of risks and consequeotly an increased guarantee of agricultural stability. A very striking feature of recent years has been the persistence with which the demand for fruit and vegetables in most countries increased, even in the years of deepest depression. The strength of the underlying trend of the new food habits could not be more convincingly demonstrated. The price of no product is immune from the general downward sweep which occurs during a period of economic depression ; but it is obvious that the commodities for which the underlying trend of demand is upwards are in a less exposed position than the others. During the recent economic depression, the prices which the producers of many countries received for liquid milk for human consumption, for fruit and for fresh vegetables fell both later and less than the prices of the staple foodstuffs. To quote only one example, the following table shows the annual movements of the prices received by farmers in the United States for various types of farm products along with the general index of farm prices :

INDICES OF PRICES RECEIVED BY FARMERS IN THE UNITED STATES.

(1929—100).

	General Index	Fruits	Commercial truck crops, i.e., market vegetables.	Dairy products.
1930	86	115	94	87
1931	60	70	79	69
1932	45	58	68	53
1933	48	52	70	53

These figures suggest that diversification not only tends to raise agricultural income, but also increases the likelihood of its being maintained during cyclical fluctuations.

Moreover, the nutrition of the producer himself is directly improved through this diversification. In the techincal conditions of cultivation prevailing in a large part of Europe, a diversification of agriculture is likely to result largely from individual farms increasing the variety of their output, and the increase in the variety of crops produced will make possible an increase in the variety of the diet of the farmer and his household. **It would be difficult to exaggerate the necessity for this development.**

Elsewhere in this report,* statistics are given to show the low level of nutrition prevailing among those engaged in agriculture in several parts of the world. The data available are unfortunately fragmentary and it is hoped that they will be improved in the near future ; the Health Organisation of the League is taking steps, in conjunction with national administration, to inquire into rural nutrition in several countries. Enough is, however, already known to make it clear that—paradoxical though it seems—the deficiencies in the diet of the millions of persons engaged in primary food production are by no means less important than of those engaged in industrial occupations. The disproportion between the prices which the small peasant receives for the crops he puts on the market and the prices he must pay for his modest purchases of industrial goods is frequently so great that, when he concentrates his productive resources on one or two crops, he is unable to supplement his monotonous and one-sided diet by purchasing other food. **Any steps which are taken to increase the number of crops produced on such small farms cannot but have a beneficent effect on the producers' nutritional status.** In some cases, natural conditions limit the variety of crops which can be produced, but in others conditions are more favourable to the production of foods which are notoriously deficient in rural diets. Through education and instruction, much could be done to improve the diet of rural populations in this way.

Agriculture may expect to derive still other benefits from the movement towards better nutrition. In most Western-European States, rural depopulation is viewed with considerable misgiving and there is a widespread desire to stop the efflux of young people from the country to the towns. The economical production of dairy produce and of fruit and vegetables requires more labour per unit of land than does the economic production of cereals. Most grains, once sown, require but little attention until harvesting. In

*(" Nutrition "—League of Nations Report, 1937).

dairy-farming on the other hand, labour is constantly employed in feeding, milking, etc. Vegetables also require much attention. Mixed farming is thus admirably adapted to the family structure of the farm so common in many parts of the world, and a policy of encouraging and facilitating the transition to this form of agriculture, where it is technically possible, would serve the additional purpose of making it possible for large numbers of people to draw sustenance and profit from agricultural pursuits.

Such a policy of facilitating the adaptation of European agricultural systems to the new consumption trends may well bring advantages also to the countries which, through their natural or technical conditions, are best adapted to produce the great staple foodstuffs. A greater concentration of national agriculture on supplying the increased domestic requirements of liquid milk, fruit, vegetables, eggs, etc., which would result from an improvement in nutritional standards may lead to an expansion of international and intercontinental trade in cereals, sugar, chilled and frozen meat, and butter, with mutual profit to the producing and consuming countries.

The objection is sometimes raised that a deliberate policy of diversification of farming might result in increased dependence on foreign supplies of essential foodstuffs in case of national emergency, and that therefore encouragement should be confined to the production of high-energy foods, such as the cereals and sugar-beet. It is undoubtedly true that, per unit of land, a larger number of calories for human purposes can, in normal circumstances, be derived from sugar-beet and cereals than from the highly protective foods. Certain considerations, however, weigh on the other side. In particular, it must be observed that dairy-farming and cereal production are not necessarily mutually exclusive alternatives. The method of feeding the animals is the determinant factor. Under the method of "arable animal husbandry" in use in Denmark, the animals are partly fed with cereals which the individual farmer grows himself. It has been shown that **the change from cereal exporting to specialised dairy production in Denmark involved no reduction in the total production of cereals.** Domestic cultivation was indeed intensified, though the type of cereals and the purpose for which they were produced changed. The natural and technical conditions of cultivation (e.g., the amount of rainfall in relation to evaporation, the size of holdings) suggest that "arable animal husbandry" can be much more widely extended to other European Countries.

The increased food consumption which it is the object of nutrition policy to encourage depends ultimately (measures of social assistance apart) upon the real purchasing power of the consumer

and upon his knowledge of the nutritive value of the protective foods and willingness to apply this knowledge.

The purpose of nutrition policy is to direct consumption, both quantitatively and qualitatively, along the lines which the new science of nutrition has indicated as being conducive to health and efficiency. A necessary prerequisite for such policy is knowledge of the factors mainly responsible in determining consumption levels and the state of nutrition. Among these factors, it is clear that food prices, incomes and the level of nutritional knowledge play a great part.

In this connection, the education of the agricultural population is of primary importance. The countries where the greatest advances in efficiency have been made in recent years are those, such as Denmark, where the standard of education among the rural population attains a very high level.

SPECIAL DIETARY NEEDS OF DIFFERENT CLASSES AND AGE GROUPS.

Study of the incidence of nutritional disease has demonstrated the general principle that, where a specific dietary deficiency exists, evidence of its effects will be first apparent in those individuals who are subjected to special physical strain.

If the protective elements are adequate in a diet, the needs for support of extra manual work can easily be met by additional non-protective foods, such as fats and carbohydrates, from which the additional energy can be obtained. Where the supply of protective elements is inadequate, physical strain will often make the defect manifest. Thus, in the history of the arctic exploration, where the diet lacked the antiscorbutic elements, men performing hard manual work have frequently been the first to sicken of scurvy. In the East and West Indies, where the diet consists too exclusively of polished rice and is lacking in B vitamins, beri-beri frequently attacks expectant and nursing mothers as well as gangs of coolies performing heavy work. Where the diet is deficient in calcium salts and phosphates (as, for example, in Northern China and North-West India), it is chiefly the child-bearing women who suffer from osteomalacia (softening of the bones), although men are also affected if the deficiency is very severe. Special need for protective food arises in cases of expectant and nursing mothers, who have to perform extra nutritive functions in addition to nourishing their own bodies. Growing children also require an abundance to provide nourishment for their growing tissues and the younger the child the greater the need for the protective foods. In these cases, there is special need for an

adequate mineral and vitamin supply and for "good" protein. The results of deficiency may remain latent for some length of time in a manner analogous to the incubation period of an infective disease of low virulence, such as tuberculosis. Malnutrition, especially in children, affects not only the physical health, but also the mental development. It is a great evil at all ages, but there are specially sensitive periods when the organism is growing, such as are found in uterine life, in early childhood and in adolescence, when the ill-effects of faulty nutrition are much more serious and may even be irreparable.

(a) EXPECTANT AND NURSING MOTHERS.

There is good reason to believe that a large amount of sickness and disability associated with child-bearing, and the high mortality rates of pregnant women, could be substantially reduced by improved feeding of these women. During pregnancy and lactation, the mother has not only to be supplied with all the nutritional factors necessary for her own health, but has also to sustain the extra burden of having to provide many essential chemical substances for the development of the growing embryo and foetus. It is undoubted that many modern diets are deficient in certain chemical substances and bring about much ill-health to the mother as well as defective development and diminished resistance of the foetus and infant. One of the commonest defects in modern civilised diets is a faulty mineral supply leading to disordered calcium matabolism, so that the mother has to sacrifice the calcium salts of her own bones for the developing offspring. This deficiency may be so great as to result in osteomalacia, but, whereas this is rare in European countries, smaller defects in calcium metabolism are undoubtedly common. This is evident in the increased tendency to dental caries in women at these times. Other distressing complaints during pregnancy, which are apparently related to the defective calcium nutrition, include muscle soreness and weakness, and the consequent inability to perform ordinary daily activities, which is generally not relieved by rest during the day or on retiring at night ; also, the inability to sit or lie long in one position, a condition often associated with intervals of more definite muscle spasm and contractions which may be quite severe. In an investigation made in America on 576 cases of pregnancy, 316 complained of symptoms of this nature. In almost all these cases, relief followed the administration of additional calcium and vitamin D.

In a Norwegian investigation, eleven women out of sixteen were found in a condition of negative calcium balance towards the end of pregnancy—that is to say, these women were losing more calcium from their body than was provided in their food, and this negative balance was made positive by increasing the daily calcium intake by providing them with about two pints of milk a day. Other sources

of vitamin D, such as cod-liver oil or egg-yolk, were also effective in improving the condition.

Another substance which is likely to be deficient in the diet of pregnant women is iron, of which the maternal organism has to supply a relatively large quantity to the foetus. A large proportion of women of child-bearing age suffer from simple anaemia, and this condition is exaggerated by pregnancy and lactation. Thus, in an investigation made at a hospital in London, rather more than 50 per cent. of nursing mothers had a haemoglobin content of the blood of less than 80 per cent. This common deficiency can be repaired either by giving iron salts in pregnancy or, better still, by giving foodstuffs rich in iron, such as meat, egg-yolk and vegetables.

It is well known that a deficiency of iodine in the diet of pregnant women may be of great significance. Only small quantities of iodine are necessary to supply the demands of the offspring at this time, but this minimum is essential to prevent parental abnormality of the thyroid gland, which predisposes the child to simple goitre, and, if sufficiently severe, to cretinism, and ordinary foodstuffs are so deficient in iodine that it is sometimes impossible to ensure even this small amount. In some countries in Central Europe, this difficulty is overcome by giving iodised salt in food—that is to say, sodium chloride containing 1 part of sodium iodide in 200,000 parts of sodium chloride. As regards natural foodstuffs, sea fish is the only rich source of iodine and, where procurable, this ought to be included in the diet of all pregnant women once or twice a week. Otherwise, it is essential to add iodised salt to the food. Japan is the only country which is free from goitre (about one case per million of population). This is due to its high consumption of foods of marine origin, all of which contain iodine.

There is evidence that vitamins are commonly deficient in the diet of pregnant women. The commonest deficiency is probably that of vitamin D ; vitamins A and C are also ingested in deficient amount in many instances. These dietetic defects, except in the case of vitamin D, can be readily overcome by including such protective foods as milk, eggs, green and other vegetables and fruit in the diet. Where there is lack of sunshine, vitamin D can be provided in abundance in the form of cod-liver oil or of some preparation of the vitamin itself.

(b) INFANTS.

The Importance of Breast-Feeding.

Complete breast-feeding of infants is of very great importance. It is cheaper, simpler and cleaner than artificial feeding and, in case of a properly fed mother, the benefits brought to the infant are great.

Impressive evidence on this point was supplied by a large-scale inquiry reported from the Infant Welfare Centre of Chicago, in which 20,061 infants attending the centre between the years 1924-1929 were closely followed up for the first nine months of each infant life. Of these 48.5 per cent. were wholly breast-fed, 43 per cent. partially breast-fed, and 8.5 per cent. wholly artificially fed. The artificial feeding was carried out on a definite plan, and all the infants—artificially fed and otherwise—were attended at intervals by the officials of the centre. The mortality rates of these different groups of infants were as follows :—

	Number of Infants	Total deaths.	Percentage of deaths of Infants
Wholly breast-fed ...	9,749	15	0.15
Partially ,, ...	8,605	59	0.7
Artificially fed ...	1,707	144	8.4

It will be seen that the mortality rate among the artificially fed infants is fifty-six times greater than that amongst those completely breast-fed. The difference in the death-rate between these classes of infants was largely due to deaths following respiratory infections and, to a less degree, gastro-intestinal and other infections. Thus, whereas only four out of 9,749 of the breast-fed infants died of respiratory infections, eighty-two out of the 1,707 artificially fed infants died from this cause.

No clearer evidence could be obtained to enforce the advantages of breast-feeding as compared with artificial feeding. Similar impressive evidence on the value of breast-feeding was afforded by the enquiry of the League of Nations into the causes of infant mortality in six European and four South-American countries, which also demonstrated the part played by bad feeding in infant mortality. Where this mortality was low, the digestive troubles usually caused by defective feeding were rare ; where it was high, digestive troubles were very prevalent—they were the outstanding cause of death, and it is by reducing them that mortality can be reduced. Conversely, where breast-feeding was general the " nutritional peril " was usually small ; where artificial feeding predominated it was great. But, although the superiority of breast-feeding over artificial feeding with cow's milk has been demonstrated, breast-fed infants may yet be improperly nourished if, in addition to their mother's milk, they are given other untimely or unwholesome food, or do not receive the necessary vitamins in the form of supplementary foods.

The increased frequency of respiratory, gastro-intestinal and other infections in artificially fed infants and the resulting greater mortality can be ascribed to two causes. One is the "food peril" itself, which may be due to the infected milk of an artificial diet or to the irritating and indigestible nature of other constituents, and the other is the diminished degree of resistance to infection produced in infants fed on artificial diets as compared with those receiving mother's milk. All milk which is given to bottle-fed infants should be boiled.

Common Nutritional Defects of Infants.

The necessity for proper feeding of the nursing mother in order to allow for the maintenance of her own health, to ensure the presence in her milk of a good supply of all the essentials for the infant's health and development, and even for the continuation of an abundant milk secretion, has been mentioned above. In breast-feeding under good conditions, the need for giving supplementary dietetic substances to the infant is diminished. In most cases, however, it is advisable to include cod-liver oil to supply additional vitamins A and D, and iodine, and some form of vitamin C, such as orange juice. Where this is not available, the juice from grated raw potato, cabbage, carrots or turnips will serve equally well. Great care should be exercised that the vegetables are thoroughly washed, and the hands should be thoroughly clean before preparing the juice.

Infants at birth have an abundant supply of iron stored in their livers and, in the period of milk-feeding, these stores are gradually used up so that the haemoglobin in the blood is reduced from 100 per cent. at birth to about 70 per cent. at the age of three months. This can be regarded as a physiological type of anaemia, as it occurs in practically all infants, both breast and artificially fed, although the fall is more severe and the recovery during subsequent months less in artificially fed than in breast-fed infants. The administration of iron to these infants will raise the haemoglobin level to 77 per cent. and upwards in the period from 5 to 12 months of age. In untreated infants, the haemoglobin will generally drop from 70 per cent. at 5 or 6 months of age to 65 per cent. at 12 months of age. It has also been shown that the infants with low haemoglobin in their blood have a much higher sickness rate due to infections than those receiving iron. The need for including iron-containing foods, such as egg-yolk or some form of iron itself, into the diets of infants over 6 months seems evident.

Even in the case of breast-fed infants, it may be desirable to give dietary supplements, but the need varies according to the climate. Thus, infants born in the tropics and exposed to much sunshine may need no extra vitamin D. Where infants are not so exposed it is of

great importance that the diet should have a high calcifying value from birth onwards to ensure perfect calcification of the developing teeth and the proper growth of the jaws, preventing subsequent irregularities of the teeth. Such a diet will also prevent rickets and osteoporosis * and ensure the formation and growth of good bones.

In the case of the artificially fed infant, the inclusion of vitamin D and other specific protective substances is of much greater importance. Such infants ought always to be given cod-liver oil, and orange juice, or some other product rich in vitamin C, also egg-yolk, because the common illnesses of infants, such as rickets, defective formation of teeth and anaemia, are much more frequently found in artificially fed than in breast-fed children, while gastric and respiratory infections in the former are much more likely to be severe and even fatal.

There is a common practice nowadays of including cereal and cereal products in the diet of young infants. The immediate effect of giving such foodstuffs is often apparently beneficial, as indicated by the increase in weight. The modern teaching of nutrition, however, is against giving cereals before 8 months or so, and even then only small amounts should be given. Many cereal products are very poor in vitamins and available mineral elements and their inclusion in the diet limits the intake of milk and other protective foods. There is also evidence that they actually are harmful in the sense that they increase the demand for vitamins A and D and calcium and that their own calcium and phosphorus content are not available for the formation of bone in the growing organism under some circumstances. Thus a rapidly growing infant nourished with cereals is more liable to suffer from defects of calcification of the bones and teeth than one on a diet of milk and other protective foods only. It is probable also that the consumption of cereals by these young infants diminishes their resistance to broncho-pneumonia, intestinal and other infections.

The enquiry made by the League of Nations into the causes of infant mortality referred to above made it clear that the pernicious combination of poverty and ignorance was largely responsible for malnutrition in infancy, as, indeed, for that seen in other stages of human life.

(c) EARLY CHILDHOOD, PRE-SCHOOL AGE, NURSERY-SCHOOL AGE.

As a rule, maternal and infant welfare institutions do not yet follow the child beyond the end of its second year, and there is conse-

*Osteoporosis is a condition of the bones in which the substance which gives them hardness—i.e., calcium phosphate—diminishes. Such bones easily fracture.

quently a gap in the health supervision between infancy and school age. Yet that is the time when malformations of the bones, dental defects and abnormalities of the pharynx appear. They will be discovered by the school medical officer, but it will be then too late to prevent and, in some cases, to remedy them. It is desirable to prevent these causes of chronic ill-health as far as possible by procuring improved feeding of children in these early years, both by extending the application of social services and infant welfare institutions forwards, or of the school medical services backwards to this age, and by increasing the knowledge and means of poor parents for better feeding of their offspring.

By the time children enter school, at the age of 5, large numbers show some form of physical defect and, although there is no proof that all of these defects could have been avoided by improved feeding, there is good evidence that many would not have developed under such conditions. In a recent inquiry (1931) in London schools, it was revealed that, among children of 5 years of age, there were from 67 per cent. to 88 per cent. of cases of abnormalities of the bones, 67 per cent. to 82 per cent. (according to the gravity of the symptoms) of cases of adenoids, enlarged and septic tonsils, and other disorders of the pharynx, 88 per cent. to 93 per cent. having badly formed or decayed teeth. There is evidence that the defective bone formation and much of the dental decay among these children would have been avoided by the inclusion in their diet of large quantities of the protective foods, such as dairy products, and therefore less reliance upon bread and other cereals. How serious and widespread may be the defects in the feeding of children at this age can be seen in the following example: in 1921, in a city in the United States, out of 6,015 children of pre-school age, 90 per cent. were found to be receiving an inadequate diet according to current standards, 57 per cent. never received any fresh milk, 16 per cent. no milk of any kind, 59.5 per cent. no eggs, 60 per cent. practically no fruit, 50 per cent. no vegetable other than potatoes. As an aggravating circumstance, these dietary deficiencies were accompanied by a lack of proper rest or sleep. Is it any wonder that so many of the children beginning school life show physical defects and mental inactivity?

It is just at this age that there is great need to maintain the resistance of children at the highest possible level against the ravages of the infectious diseases to which they will be exposed, such as measles and scarlet fever, and especially their sequelae, broncho-pneumonia, middle-ear disease and nephritis. These diseases, if they do not kill, often leave the child with some chronic disorder which disables it for life. It is, for instance, at this age that deafness often has its starting-point owing to infection of the ear following measles and scarlet fever. Below the age of 3 years, measles is a

particularly deadly disease, and there is suggestive but not conclusive evidence that the high mortality rate at this and older ages could be reduced by better nutrition of such children.

(d) SCHOOL AGE.

In the early years of school life, many children are already "damaged goods." They frequently show evidence of previous defective feeding and lack of care in deformity of the bones of the limbs, chest and head, in bad dental structure often associated with decay, in deafness to a greater or less degree, in running ears, septic tonsils and adenoids, and in simple goitres. These indications of disease are not generally, however, from the present medical point of view, regarded as evidence of malnutrition and, indeed, there is no definite proof that some of them—e.g., running ears, enlarged and septic tonsils—would have been prevented by proper feeding from early life; although this is probable. During the past fifteen years, the effectiveness of the provision of iodine in preventing goitre has been demonstrated on a large scale in several areas.

Malnutrition is usually diagnosed in school-children on the basis of subnormal growth and weight and general sickly appearance of the child. Nothing is more important than that a new attitude should be adopted towards this problem, for whereas such results of improper feeding as subnormal growth and weight and undefined general ill-health can usually be rapidly improved by better feeding conditions, the more chronic conditions due to earlier defective dieting cannot be so easily remedied, but continue to act as a handicap throughout life. The system of medical inspection of children that is now generally established under State control in different countries must be sadly handicapped so long as it has to deal with many children who come under its control from the beginning in a pathological state. Prevention rather than treatment of disease must be more and more emphatically stressed and, so far as this can be procured by better feeding, this ought to be done.

Even, however, on the present basis of diagnosis, there is abundant evidence of malnutrition in school-children. From 20 to 30 per cent. of school-children were found to be under-nourished in the poor quarters of Paris ; in some cases the only meal the children had during the day was that provided by the school canteen. Such cases are reported as frequent in Yugoslavia. In Poland, according to a recent estimate, 25 per cent. of school-children are ill-nourished in certain regions, 7 per cent. are threatened with tuberculosis, while additional meals should be given to at least 50 per cent. (according to documents received by the Mixed Committee). In the United

States, 7½ million school-children were under-nourished in 1933, according to a statement by the Secretary of Agriculture.

In 1917, according to specialists in rickets, nearly all the children of the negro population of New York were suffering from this disease ; 83 per cent. in Connecticut in 1923 ; 43.4 per cent. in the villages in the North of Norway in 1931 ; 33 to 67 per cent. in two northern counties of Sweden. Rickets is still an important social disease in England and Ireland, although the discovery of its aetiology and means of prevention is gradually causing its reduction. As regards dental caries, the enquiries carried out in various European countries have shown it to be present in from 50 to 95 per cent. of the children examined. In a recent inquiry undertaken in Norway, only 160 out of 25,000 school-children examined possessed perfect sets of teeth. According to the English report mentioned above, out of 3,303,983 children examined in 1933, 2,263,135 needed dental treatment. Dental caries frequently results in abscesses at the roots of the teeth. From these abscesses, disease-producing organisms frequently enter the blood and set up infectious processes in the joints, kidneys and other sites. Dental caries lays the foundation for much serious ill-health.

It is true that all these observations have not been based on uniform tests and that the state of ill-health of children likewise depends on other causes : sequelae of previous infectious diseases, faulty hygiene in the home and inadequate amount of sleep and exercise in the open air.

So far as greater height and weight, muscular strength, general vitality and more vigorous activity are concerned, there is definite proof that much can be done by improved feeding of school-children. The evidence is of two kinds : first derived from observations in which diets of children in boarding-schools have been constant over a period of years and then changed over a further period of years ; and, secondly, from experiments in which milk or some other supplement has been added to the dietary over a period of months, and the effect of this change on the children noted. An example of the first of the experiments is seen in one English Public School, where the diet was closely controlled over the years 1913 to 1933. Between the periods 1919-20 and 1928-29, there was a substantial increase in milk consumption, butter was substituted for vegetable margarine and there was a decreased consumption of bread. Associated with these changes in the diet, the average height of boys of 11 years of age increased from 4 ft. 6.65in. to 4ft. 7.33in. and that of boys of 15 years of age increased from 5ft. 2.89in. to 5ft. 3.97in. There was a correspondingly large increase in weight of those children during the period of improved feeding. Curiously, two other improvements

in general condition, probably due to increased milk consumption, were observed which are of great significance—namely, (a) a great decrease of fractures of bones in accidents, and (b) a decrease in rheumatism and rheumatic conditions.

The effect of adding milk and other supplements to the diet for a period of one year was, according to an English writer, equally dramatic in its action. A pint of milk added daily to what was considered a good diet in an institutional boarding-school caused in boys of 6 to 11 years old an increase of 2.63 inches in height and of 6.98 lb. in weight as compared with increases of only 1.84 inches and 3.85 lb. by similar boys who did not receive the supplement of milk. It was also remarked that there was much less illness among the extra-milk children, especially naso-pharyngeal catarrh, a reduced tendency to chilblains, a better condition of the skin, while the children were more alert and high-spirited. Burnet and Aykroyd have given accounts of other similar experiments on adding milk to the diet of school-children, and **it may be taken as completely proved that the addition of safe milk to the diet of school-children would greatly increase their average height, weight, strength, vitality and general health.**

Since school-children do not develop rickets or bone deformities, but only carry the stigma of earlier attacks of this disease, it is often assumed that they do not require so much milk to supply calcium as in earlier years. There is an element of truth in this idea, but only an element. The bones and teeth of school-children are growing and calcifying rapidly, and defective calcification of bones makes itself obvious by the ease with which they break. The frequency of bone fractures is a great social problem in some countries, especially in industrial countries, and deserves more attention than it receives, and there is little doubt that this trouble would be greatly reduced by the consumption of larger quantities of milk and other protective foods.

Another important problem of child health is the tendency, during school age, to contract acute rheumatism with its tragic associates, chorea, heart disease (rheumatic endocarditis), one of the commonest causes of chronic disability, ill-health and early death in some countries. If the greater consumption of protective foods can reduce these distressing conditions—and there is some suggestive evidence that it can do so—a great blessing would be conferred on mankind.

Compulsory education has been generally adopted throughout the civilised world. It is agreed that large numbers of school-children are not mentally or physically capable of profiting by this universally

accepted recognition of the social obligation to educate the mind of every individual. Might it not be as well to make such children more physically and mentally fitted to benefit fully from these educational facilities by assuring that their nutritional needs are fully satisfied ?

(e) ADOLESCENCE.

The state of nutrition among adolescents is much less accurately known than among school-children. All authorities on the subject are, however, agreed that, under normal conditions of life, this is one of the most crucial periods. The rapid rate of growth of the adolescent makes abundant and efficient nutrition particularly important and yet this is the period when the State ceases to show a maternal interest in his physical well-being. There is evidence that, even in the case of boys and girls entering good employment at the age of 14 or 15 with reasonably good physique, they suffer much deterioration by the age of 18, a condition which is largely due to insufficient and unsuitable food eaten during this period.

This is the age when the most serious cases of pulmonary tuberculosis occur. Every tuberculosis specialist is convinced that the appearance of tuberculosis before the twentieth year is due to two main causes : overwork and malnutrition.

Although the general incidence of tuberculosis has been decreasing in many countries gradually during the past 100 years, and especially during the last thirty years, it is a distressing fact that this rate of reduction does not occur to the same extent in the case of adolescent and young adult people. Indeed, in young women there has been an increase in tuberculosis during recent years in some countries. This state of affairs has been ascribed by some to the modern habit of "slimming," by others to the greater expenditure dictated by modern habits of life on clothes, which leaves too little money for the purchase of proper food. Whatever may be the real explanation, it is undoubted that many adolescents in all countries, but particularly in industrial countries, are being improperly nourished at the present time and are suffering in consequence. Efforts of an educative nature ought to be taken to make adolescent boys and girls realise that the best health and the fullest physical and mental development is only possible if their dietary contains an abundance of the protective foodstuffs.

(f) YOUNG SOLDIERS.

Military service claims young men at the end of adolescence, before they are fully mature The rejection as unfit of a number of the men called up is not evidence that malnutrition is the only cause

of their rejection, but military doctors do, in fact, assert, on their knowledge of the facts, that malnutrition is one of the main causes. In Belgium, as a result of the examination of 49,000 recruits in 1931, it was found that physical fitness had declined as compared with pre-war statistics, and among the causes (increase in school work, unemployment, excessive championship-hunting in sports), the defective feeding of children during the war and the increase in the incidence of diseases of the digestive tract are ranked first. In Denmark, a third of the recruits present a combination of symptoms known as "Danish disease" (flat feet, varicose veins, pains in the extremities and cramp in the calf of the leg). In Finland, notwithstanding the very high level of athletic attainments, 21 per cent. of recruits are rejected, and doctors attribute this to general malnutrition among the poorer classes. In Poland, where there is a mass of evidence to show the vast extent of malnutrition, the proportion of recruits rejected is extremely high. It is a pity that the examination of recruits is not made more use of as a means of inquiry into malnutrition. How can we help being alarmed when we learn that, in the army of a large European nation, the proportion of men rejected for physical unfitness has risen, between 1923 and 1932, from 45.25 to 67.78 per thousand ?

(g) **ADULTS.**

Every fresh inquiry, in town or country, reveals either patent or latent malnutrition.*

The recent history of the high incidence of malnutrition among adults seems to be identified with that of unemployment. If unemployment has not augmented the evil of malnutrition to the extent that might have been expected, it is because malnutrition has been held in check by the development of Public Health Services. The effect of unemployment relief is reflected in an improvement in the diet of the unemployed. On the one hand, expenditure of energy and food requirements were diminished, and, on the other, when large-scale social organisations take care of the unemployed, the latter's diet, though less abundant, is often more rational.

It would be a mistake to believe that, generally speaking, unemployment produces no harmful effects. Its effects are to be sought, not so much among the adult unemployed as among their

*In the United States of America, according to a recent communication from the Cost-of-living Division in the Ministry of Labor, of 209 families examined in the North-Atlantic States, 14 per cent. were found to be undernourished "from every point of view." In Yugoslavia, the so-called "passive" regions, which produce neither wheat nor other vegetable foodstuffs, are suffering to a great extent from malnutrition owing to the exiguity of their purchasing power.

growing children. For more than two years now, in the United States of America, the Children's Bureau has been collecting information of different kinds from various sources which proves that the depression is having an increasingly bad effect on the nutrition and health of children. Thus, according to the New York City records, the percentage of school-children in a bad state of nutrition rose between 1929 and 1932 from 16 to 29 in Manhattan and from 13 to 23 in the Bronx. At Philadelphia, among young children under 6 years of age examined at the "Community Health Center," the figure rose from 11 (1928-1930) to 24 (in 1932).

The ravages caused by rickets, the most serious deficiency disease in countries of the temperate zone, have been described above in the section on children. It is in adult women, however, that one of the most serious disabilities of rickets becomes manifest, although the cause of the trouble has really started in the young and adolescent stages of life. The condition referred to is contracted or rickety pelvis, a defect frequently found in women in industrial centres. The small size and deformed shape of the pelvis in such women prevents the easy birth of the infant. A greater call on surgical interference is therefore made in child-birth under such circumstances, and this not only means greater distress to the mother, but also an increase in the liability of these women to puerperal fever, one of the commonest causes of death after child-birth. This is one of the best examples that can be given of the importance of prevention when dealing with a common and widespread disorder. The problem of the large number of deaths associated with child-birth is rousing much interest in some countries. Surely an essential point in any attempt to diminish this serious state of affairs is first to ensure fully developed and perfectly formed pelvic bones in child-bearing women by proper feeding of female children and adolescents. If this were attained, surgical help in child-birth would be much less needed and there would undoubtedly be a diminution in maternal mortality.

Another deficiency disease, pellegra, still plays havoc in temperate countries and causes 3,000 deaths a year in Roumania and 4,000 in the United States of America. If complete data were available, deficiency diseases, whether patent or latent, and their sequelae, would probably be found to occupy a far more important place in the annals of malnutrition than at present appears. Certain diseases which were thought to have been stamped out or to have become very rare are again making their appearance. In connection with the privations caused by the war, Danish doctors noted a sort of recrudescence of diseases of the eye caused by nutritional deficiencies, including a deficiency in vitamin A: thickening and opacification of the cornea, and weak vision, particularly at dawn and dusk. These symptoms would be detected more frequently if they were looked for more often.

There is considerable evidence of the influence of defective feeding on the tuberculosis death rate. The figures must be treated with caution, because in most cases other physical and mental causes are present, such as overcrowding, slums, overwork and worry. But no doctor who has had any experience of tuberculosis will deny the influence of diet upon the onset, progress and also the prevention and cure of this disease. Moreover, there have been, in the recent history of Europe, during and after the war, certain sad exceptional periods distinguished—unenviably—by food restrictions with which has coincided a very marked recrudescence of tuberculosis mortality : in the United Kingdom as from 1915, in the Netherlands as from 1916 and in French Flanders during the enemy occupation ; in Germany during the war and during the inflation period of 1922-23. A few months after the cessation of the restrictions or blockade, the death-rate fell to its pre-war figure. Generally speaking, it had been higher in the towns than in the country, because the country population could grow their own food and thus were not affected by some of the restrictions. In Denmark, the tuberculosis death rate, which had been steadily falling before the war, increased a little during the war as a result of food restrictions, although at that time there was no housing shortage. Subsequently, after the war, the tuberculosis death rate resumed its downward trend in spite of a prolonged housing shortage ; circumstances had dissociated two of the causes of tuberculosis mortality—housing and nutrition—and had demonstrated the outstanding importance of the latter.

Tuberculosis in industrial centres, although diminishing in incidence, is still one of the great killing diseases. It must also be remembered that, although this disease is being gradually reduced, the rate of reduction is much smaller in adults than it is in children. In fact, in dealing with adolescents, it was pointed out above that the incidence of tuberculosis in young women (15-25) and to a less extent in young men has actually increased in some years during the past decade. Apart, however, from adolescence, the death rate due to tuberculosis in the adult is still very high, and it may be hoped that a wider adoption of the teachings of the present report by adults will bring about a substantial decrease in incidence, together with a corresponding fall in the death rate. Bronchitis, like tuberculosis, is a more deadly disease among poor people than among the well-to-do, in contrast to the greater frequency with which diabetes mellitus and appendicitis occurs among those with more money to spend. The position as regards the question of some relationship between bronchitis in the adult and malnourishment is similar to that of tuberculosis—that is to say, there is only suggestive, but not established evidence of a direct correlation. Here again, therefore, it is possible that an increase in the consumption of protective foods, especially

by poor people, would reduce the incidence and death rate due to this disease.

Though further inquiries will be necessary to establish the influence of certain given foodstuffs on human susceptibility or resistance to infection, there can be no doubt as to the general value of a proper diet in increasing resistance to disease.

(" **Nutrition—Final Report of the Mixed Committee of the League of Nations, 1937).**

MILK AND NUTRITION

The British Advisory Committee on Nutrition published a report in 1937 in which they make a comprehensive survey of the nation's diet.

Among other items the Committee " regard the consumption of a sufficient quantity of milk as the key to proper nutrition," and they call attention to their previous memorandum on the Nutritive Value of Milk and to the fact that consumption of milk is much below the recommended standards. The consumption of liquid milk per head, unlike that of other foods, has slightly declined since before the last war, and though the decline has been approximately offset by increased consumption of dried and condensed milk, " it remains true that consumption of milk in all forms per head of the population is too low."

The average daily consumption of milk per head should, in the Committee's view, be about two pints for expectant and nursing mothers, from one to two pints for children, and not less than half a pint for the rest of the population ; this is equivalent to about seven-eighths of a pint per day for the whole population. At the present time, the consumption of milk in all forms (in England) is about half a pint per head per day—only 60 per cent. of the suggested amount, and much lower than that of many other countries, and the Committee say that the nation cannot remain indifferent to the under-consumption of a foodstuff so important in a country so eminently suitable for milk production.

Milk, the Committee record with emphasis, is the most complete food known, and there is no single step which would do more to improve the health and resistance to disease of the rising generation than a largely increased consumption of **safe milk** by mothers, children and adolescents.

The Committee also draw attention to the high nutritive value

of skimmed milk and eheese, and refute the view that the former "possesses little or no nutritive value." They deplore the wastage of skimmed milk and suggest that it would be most eonvenient for general use in the dried state.

The Committee also draw attention to the partieular value of sea-fish as a souree of good protein and iodine and other minerals; herring and maekerel, they state, are especially rieh in vitamins A and D.

The Report was a preliminary survey; further researeh is needed and is proeeeding. The keynote of this 1937 report was the advoeacy of more balanced diets, partieularly a largely inereased consumption of safe milk, especially for mothers, children and adolesecnts.

VISUAL DEFECTS

The ineidenee of defeetive vision was 16.8 per eent. during 1939, as eompared with 17.4 per eent. last year. From the following table, showing the ineidenee of visual defects sinee 1936, it is obvious that a striking reduction has taken place. The figures now tend to remain about 17 per eent. whieh may perhaps be the irreducible minimum under pfesent eonditions.

YEAR.	1936	1937	1938	1939
Percentage of children with Defective Vision (Co. Donegal)	26.0	16.9	17.4	16.8

OPHTHALMIC SURGEON.

The Donegal County Board of Health are to be eongratulated on their foresight in that they have at length appointed an Ophthalmie Surgeon for the County. Dr. Godfrey O'Donnell was appointed to this important position in September, 1939, and already he has done a great deal, by steady unremitting work, to clear off the large aeeumulations of unavoidable arrears in regard to refraetion of sehool-ehildren who had been referred for treatment. The Eye and Ear Hospital, Derry, have done very good work for us in the past, and it is mueh appreeiated by this department. The number of refractions that eould be performed by the hospital was, neeessarily, very small in view of the large numbers awaiting treatment. The present intention is to allow the Derry Hospital to finish off the list of children with whieh they had been supplied before Dr. O'Donnell's appointment, amounting to some 150 eases. Dr. O'Donnell will also be

responsible for eye treatment at the district hospitals, and has temporarily arranged to hold sessions as follows :—

Lifford Hospital .....First Saturday of the month.

Letterkenny Dispensary First and third Thursday of the month.

Doncgal Hospital .....First and third Monday of the month.

Carndonagh Hospital ....Second and fourth Thursday of the month

Glenties Hospital .....Second and fourth Monday of the month.

The hour is 11 a.m. in all cases.

These sessions should be a boon to the many poor people who cannot afford to travel long distances to Derry and pay for ophthalmic treatment. Many of the older people in rural districts are greatly handicapped in every department of their daily life by defective vision, and it is to be hoped they will avail themselves of the facilities now provided by the County Board of Health.

TRACHOMA.

No cases of this disease were found in the school population during 1939.

TEETH

PERCENTAGE OF CHILDREN WITH DENTAL CARIES.
(Marked Degree or for Treatment)

1931	1932	1933	1934	1935	1936	1937	1938	1939
28.5	35.1	38.0	35.1	44.9	44.0	36.9	39.4	46.6

46.6 per cent. of children showed a marked degree of dental caries as compared with 39.4 in 1938. As remarked in a previous report, it is unofficially estimated that about 75 per cent. of school-children show dental disease when examined by a dentist with probe and mirror. The above figure of 46.6 per cent. in County Donegal is obtained from the necessarily rather cursory mouth inspection carried out by the school medical officer. In our unsatisfactory scheme as at present constituted the dentist simply accepts the doctor's figures and extracts all carious teeth at special sessions arranged in the wake of the school inspections.

DENTAL DECAY.

There are two schools of thought as to the origin of this condition. The Mellanbys, who have done a great deal of experimental work on puppies, believe that lack of vitamin D in the food is an all-important factor in the production of dental caries. The observations of these investigators tend to show that the teeth of British children are on the whole very badly formed, and that the incisors, which are most influenced by antenatal nutrition, are better calcified than the later developed molars. This suggests that the dieting of infants is in even greater need of improvement than that of pregnant women.

Some work done by Lady Mellanby and C. L. Pattison is most striking. They showed that adding vitamin D to the diet greatly reduces the incidence of dental caries in children. But they further demonstrated that a diet rich in vitamin D which contained no cereal food was more effective than one equally rich in vitamin D, but containing cereals. There is apparently some antagonism between cereals (especially oatmeal and the germ of wheat) and the calcification of the teeth, a very important observation in view of the many excellent qualities of wholemeal flour. In describing the most advantageous diet for the children's teeth Professor Mellanby says it contained no bread, porridge, or other cereals, but plenty of milk, jam, sugar, potatoes and other vegetables.

The inclusion of plenty of jam and sugar needs emphasising, in view of the fact that the dental teaching of the other school of thought has been inclined to attribute all sorts of ills to jams and sugar. The exclusion of cereals from the diet of children has not hitherto been practised to any extent. We must not only increase the ration of milk and cheese, with their vital content of calcium, and the animal and fish fats containing the essential vitamin D, but we must also reduce the cereals in order to get better teeth.

Diets for children of various ages which appear to lead to the production of sound teeth have been suggested by Lady Mellanby and C. L. Pattison. The basis of the diets is the exclusion of cereals. Here are two sample diets given on consecutive days :—

I.	Breakfast :	Omelette, cocoa with milk.
	Lunch :	Milk.
	Dinner :	Potatoes, steamed mince meat, carrots, stewed fruit, milk.
	Tea :	Fresh fruit salad, cocoa made with milk.

	Supper :	Fish and potatoes fried in dripping, milk.
II.	Breakfast :	Scrambled egg, milk, fresh salad.
	Dinner :	Irish stew, potatoes, cabbage, stewed fruit, milk.
	Tea :	Minced meat warmed with Bovril, green salad milk.
	Supper :	Thick potato soup made with milk.

Alternative dishes are as follows :—

Breakfast :	Egg boiled, fried or poached ; omelette containing 2oz. minced meat ; fish, fried or steamed, or fish cake with potatoes dipped in egg and fried ; bacon, fried or finely chopped, with parsley and scrambled egg.
Dinner :	Meat, boiled or steamed ; cold meat cut into small pieces with cold, dried, carrot, onion and potato and served on a lettuce leaf ; fresh fruit salad with egg custard or cream : tinned pine-apple with jelly or mixed tinned fruit with jelly ; baked apple, centre filled with golden syrup before cooking ; junket or milk jelly or honey-comb mould which contains eggs.
Tea :	Potato cake or fish cakes : eggs cooked in various ways.
Supper :	Lentil or celery soup, made with milk, minced meat, etc.

The calorie value of these diets is 2,427 and the actual quantities of the various food components recommended were as follows :

Protein :	87	grm.
Carbohydrate :	154	grm.
Fat :	159	grm.
Calcium :	1.7	grm.
Phosphorus :	1.9	grm.

English workers say that growing children of 6 to 13 years need a daily minimum of 0.67 grm. calcium. Sherman, however, advises 1 grm. for American children.

The striking features of the above diets are that cereals (bread, rice, oatmeal, tapioca) are replaced by increase of potatoes and other vegetables, milk, fat (butter etc.), meat, and eggs. The allowance of sugar, jam or syrup is fairly high (2 oz.). Vitamin D is given in abundance as cod-liver oil as well as in egg-yolk, butter, milk, etc. The diet is rich in calcium, phosphorus and Vitamin D, and devoid of cereals, which have been found to interfere with calcification.

It seems evident from the experimental work so far carried out that whilst cereals need not be entirely excluded from the diet, their intake must be reduced, and the calcium and vitamin D increased—especially during infancy and childhood—but also before birth, by attention to the mother's diet.

The most important deficiency observed in the diet of pregnant women in Britain was in respect of calcium. If the child is to be breast-fed, as it should be, the mother's diet should contain all the requisites for herself and her child. It is not difficult to advise an expectant mother as to what food she should eat in order to conserve her own teeth and provide for those of her baby. She should take milk and milk products, especially cheddar cheese; fruits (oranges and lemons, blackberries and black currants, and the dried fruits), green vegetables, turnips, parsnips, and haricot beans; fish, especially flat-fish and herrings.

It is important to remember that the teeth begin to be formed as early as the second month of foetal life, and that even the permanent teeth are well under way by the twenty-fourth week of foetal life—so that the diet of expectant mothers requires careful supervision from a very early stage.

The League of Nations' Committee recommend the following:—

"Protective": Milk, 35 ozs.; meat, fish, or poultry, 4 oz. egg, 1; cheese, 1 oz.; green and leafy vegetables, 3 oz.; potatoes, 8 oz.; legumes dried (peas, beans, lentils), one-third oz; cod-liver oil, 1 drachm; fruit or raw vegetables for vitamin C, 500 international units (1 orange equals 650).

"Supplementary":—Energy-yielding foods, white or wholemeal flour as bread, 8 oz.; butter and sugar as needed.

It is improbable, of course, that perfect dieting of the mother

will ensure perfect development of structure in the teeth of her offspring. Certain factors such as heredity, accident or illness, or defective functioning of endocrine glands (e.g. thyroid) may exert a subversive effect on the development of teeth. Nevertheless they should have the best chance of optimal functioning by providing the expectant mother with a rich and varied diet containing the above essential ingredients.

Most of the following important information is derived from Dr. Harry Campbell—" British Diet." One is prompted to try and disseminate these facts owing to their supreme importance for this country as well as for Britain. A leading dentist in Derry informs me that he could supply enough pathological exhibits of malformed teeth and jaws from children and adults in County Donegal to stock a well-sized museum. The teeth of the people in Great Britain and Ireland are said to be the worst in the world, and it is time that some effort was made to end this disgraceful state of affairs.

Dr. Campbell, who belongs largely to the second school of thought, inquires : " How comes it that nearly all British jaws of to-day are ill-developed ? By which I mean that they fail to attain a size permitting all the thirty-two teeth to take up their position in the gum-ridges without jamming or irregularity. There is a notion abroad that the prevailing undersized British jaws are the expression of a spontaneous racial trend. This view will not bear serious examination. " The real cause is inadequate use owing to a paucity in our diet of foods compelling vigorous mastication " . . . .

The failure to appreciate the supreme importance of oral hygiene as a preventive of dental decay arises from ignorance of what effective oral hygiene implies. It requires for instance, as a prime essential, ample development of the jaws, and this implies that they shall be adequately exercised from birth until the final eruption of the wisdom teeth ; for undersized contracted jaws and consequent overcrowded teeth are incompatible with perfect oral hygiene ; in fact our small jaws are in large measure responsible for our bad teeth.

Within recent times it has been the custom among the British peoples, both at home and abroad, to consume an enormous quantity of starchy food in soft, pappy or spongy forms, such as refined spongy bread, pultaceous puddings and porridge—all-too-easily swallowed—with the result that, in striking contrast to the dietetic customs of earlier times, the modern stomach is apt to be flooded with imperfectly insalivated starchy food. This pernicious practice has led to contracted jaws and overcrowded teeth, and has promoted to a disastrous extent the occurrence of dental decay, pyorrhoea and digestive disorders.

An outstanding defect in the food of our people, as well as of many other nations, is an excess of cereals and a deficiency of animal food. Professor E. Mellanby has emphasised this disproportion, notably as it affects children, and has insisted on the necessity of reducing their cereal food, and of increasing the supply of such foods as milk, butter, cheese, eggs and even, perhaps, supplementing these by cod-liver oil (on account of its richness of vitamin D).

The most effective way of combating this evil I conceive to be the following :—

(1) Let most (preferably all) of the cereal food be limited to well-baked crusty bread. This will confer the threefold advantage of

(a) affording abundant exercise of the teeth and jaws,

(b) facilitating the digestion of the cereal food,

(c) preventing the stomach from being deluged with an excess of imperfectly insalivated cereal food.

The total effect of this restriction will be (among other advantages) to reduce the consumption of cereal food.

(2) The second desideratum is to increase the consumption of animal food. Many forms of animal food are available for the purpose, not only milk, butter, eggs, cheese, but meat, bird and fish.

Children from an early age display an instinctive liking for raw vegetable food. Those brought up in the country, not pampered by too luxurious food, and free to roam in the kitchen garden, will help themselves not only to fruits but to vegetables of many kinds such as carrots, onions, turnips, peas and the heart of cabbage. This instinct for raw vegetable food should be fostered.

Highly erroneous notions prevail among the public concerning the foods suitable for children ; small children have a natural instinct for raw fruits and salad foods : this should be encouraged from an early age, so that they may learn to appreciate the delicate flavours of this class of foods.

We need to eat more salads than we do in these countries. Raw salad foods and fruits have the twofold virtue that they provide essential minerals and vitamins, while they tend to leave the mouth clean and prevent dental decay and pyorrhoea. After lactation

some raw vegetable food should be consumed daily throughout the year.

HOME-GROWN FRUITS AND SALADS.

Seeing that everyone should daily eat a modicum of raw vegetable food, whether in the form of fruit or salad, encouragement should be given to the home production of these foods. They have a value that depends not only on their vitamin content but on their content of essential mineral salts, pigments, cellulose, and "something else" associated with freshness whose nature is unknown.

MASTICATION.

A primary need in the upbringing of our children is the early abandonment of pap-feeding, and the introduction into their dietary of foods compelling efficient mastication. Efficient mastication from the period of weaning onwards :

(1) Secures the normal development of the jaws, nasal chambers and bony cavities, indeed of the entire facial skeleton ; thus providing ample space for all the teeth to erupt without jamming or irregularity, and affording full opportunity for the grinding down of the cusped teeth and the biting edges of the incisors. Inefficient mastication during the growing years fails to secure any of these benefits. In consequence of the inadequate masticatory stimulus, the jaws remain subnormal in size, and the teeth are prevented from taking up their normal positions. Aesthetic disadvantages ensue in the shape of the hatchet type of face, and the long, irregular, obtrusive front teeth so frequently met with.

(2) Causes the roots of the teeth to move freely in their sockets, thus quickening the flow of blood and lymph in the bony sockets, their lining membranes and the surrounding gum tissues, thereby promoting the normal nutrition and development of these structures, and enabling them to offer effective resistance to the invasion of pyogenic (pus-forming) organisms.

(3) Brings into activity the normal mouth-cleansing mechanisms by stimulating the flow of saliva, by promoting the friction of detergent foods against the teeth and the gums, and by calling into activity the cleansing action of the tongue, lips and cheek.

When the new born babe is put to the breast the whole of the infant's masticatory machinery is thrown into full functional activity, involving a quickened flow of blood in the jaws and the buried embryo teeth within them. Preparatory to the eruption of the temporary teeth the child develops the instinct to gnaw hard objects, an instinct which should be freely indulged during the rest of the lactation period. Thereafter, until the twenty temporary teeth have all erupted (twenty-fourth to the thirtieth month), the child should be provided with food of increasing firmness and detergent quality. With his twenty erupted temporary teeth well ground and polished, and equipped with well-developed jaws, the child will be able to cope, so far as mastication is concerned, with any ordinary adult food—a truth not sufficiently realised.

THE TEACHING OF ORAL HYGIENE.

Doubtless the systematic dental inspection of school children does some good, but this practice is essentially a shutting of the stable door after the horse has fled. We need to teach the mothers the principles of oral hygiene, for which purpose an army of lecturers is needed to disseminate the truth—to explain in a simple manner how decay of the teeth may be prevented.

Our best chance of success is through the mothers. Once they can be got to realise how, by the observance of commonsense principles, decay of the teeth can be prevented, they will be so much the more likely to feed their children on rational lines.

From an early age, say the eighth year, school children should have the practical facts concerning the care of the teeth systematically drilled into them. They should be made to realise that decaying teeth, pus-exuding gums and malodorous breath are things to be ashamed of.

The work of dental propaganda in the schools has not yet been effectively undertaken, least of all in Ireland. It is indeed rare to come across a child who has any serious knowledge of the subject, or who seems to take the slightest interest in it.

In order to prevent dental decay we need:

(1) To secure well-developed jaws by substituting for spongy and mushy cereal food well-baked crusty bread, which compels adequate mastication.

(2) To give plenty of raw vegetable food in the shape of fruit and salads, preferably at the end of meals.

If the jaws and teeth have been properly exercised by a normal amount of mastication, the temporary teeth will show considerable wearing down before they are shed, and as regards the permanent teeth, the edges of the front teeth and the cusps of the back teeth will, as early as the late teens, show definite signs of frictional wear ; but in this country the permanent teeth rarely show a physiological degree of wearing down.

Exercise of the teeth and cleanliness of the mouth are the two great desiderata to be aimed at—no matter how nourishing the food, how rich in milk, butter, eggs and cod-liver oil, no matter how abundant the outdoor life and sunshine, we may expect caries to develop in the child brought up on food which fails to exercise the teeth properly and which tends to leave the mouth dirty.

If the teeth are properly cleansed at night, it may not be necessary to do more than rinse the mouth well out in the morning until the water used in the rinsings remains clear. Mouth rinsing, so far as is feasible, should be practised after each meal. This post-prandial rinsing might be a routine practice in schools where fruit or salad has not been the last item in the meal. The use of the tooth-brush over the grinding surfaces of the cusped teeth (grinders) every night would alone lead to great reduction in the incidence of caries.

If the tooth-brush is employed for the outer surfaces (labial and buccal) the movement should be vertical and away from the gum : it should never be transverse ; forcible transverse rubbing tends to wear away the enamel and (eventually) dentine at the gum edge, especially of the left upper canine and its neighbours. Teeth have been known to be cut through in this way.

Dr. Campbell's school of thought also holds strong views as to the pernicious influence of sugar and sweetstuffs in initiating dental decay. This view is not, however, borne out by the Mellanbys' experiments, and is at variance with the great natural liking for all forms of sugar manifested by children at every age. The harmful influence of sugar and sweets has not, in my opinion, been demonstrated in a satisfactory fashion, at any rate for the present.

TUBERCULOSIS

No definite case of pulmonary tuberculosis was discovered for the first time in 1939 at School Medical Inspection, though some children who had had treatment in Peamount Sanatorium for enlarged

hilar glands a few years previously were inspected and reported as in good health.

The number of new cases of non-pulmonary tubercuIosis discovered was fourteen as compared with twenty-five in 1938. The cases were classified as follows :

Abdominal tuberculosis	4 cases.
Enlarged glands (tubercuIous)	2 cases.
Tuberculosis of Spine	2 cases.
Tubercuiosis of hip-joint	4 cases.
Tuberculosis of finger	2 cases.

PRIMARY TUBERCULOSIS.

Tuberculosis of infants and children is usually of the primary type, and may very easily be missed. The source of infection is usually one or both parents, less frequently relatives. Ail sorts of food and drink containers may serve as earriers of infeetion.

In children there may be no recognizable signs or symptoms of the infeetion. There may be no elevation of temperature, no cough nor loss of weight. In fact from ordinary observation and clinieal examination the child may appear quite well. In some cases there may be mild evidence of the disease, e.g. some elevation of temperature, indisposition to play as usual, diminished appetite and oecasionally a cough and spit.

There is now available suffieient knowledge to permit of the eradication of tubereulosis, which will probably come to fruition in time. Under present eonditions the major part of anti-tubereulosis work is directed towards :

(1) Early detection.

(2) Segregation.

(3) Treatment.

The physieian has three important aids to diagnosis at his disposal. These are : (a) history of contact with tuberculosis (b) tubereulin test and (c) x-ray. Physical examination of children as a means of detecting early tuberculosis is very unsatisfactory, es-

pecially if of the primary lung type. History of contact with an "open case" (infectious) of tuberculosis warrants a presumption of infection. A positive tuberculin reaction indicates that some infection has taken place, while an x-ray of the chest is invaluable in determining the type and extent of pulmonary infection.

The signs of bone and joint tuberculosis may not appear early in the surgical form of the disease. Limping, with pain on movement, spasm of muscle and limitation of movement are among the early manifestations. Treatment of these bone and joint cases is usually a matter for the orthopaedic surgeon.

GRANCHER SYSTEM FOR THE PREVENTION OF TUBERCULOSIS.

The system started in 1903 by Professor Joseph Grancher in France of boarding out healthy children from tuberculous homes in foster homes in the country was the subject of a comprehensive review by Professor Marfan at a recent meeting of the French Academy of Medicine. With its central office in Paris this system has been decentralised in such a way that the provincial centres now enjoy more or less complete autonomy. The provinces alone are dealing with more than 5,000 foster children this year. As for the results, so far as the threat of tuberculosis is concerned, it has been found that among 4,000 children dealt with by the Paris Central Office there were only twelve who developed tuberculosis after being removed from tuberculous to healthy homes, and among these twelve there were as many as nine who recovered under sanatorium treatment. With regard to costs, Professor Marfan made this instructive comparison. A tuberculous patient requires three years' treatment in a sanatorium at the cost of 15,000 francs every year, and even so, only one out of every three tuberculous patients recovers. To achieve a single recovery it is therefore necessary to spend 135,000 francs, whereas it costs the Grancher system only 25,000 francs to prevent a child from becoming tuberculous.

Constant vigilance is required on the part of the School Medical Officer in the search for cases of pulmonary infection in school-children. This type of infection is not by any means as rare as was at one time supposed, though unfortunately it is very difficult of detection. One badly-infected child in a school (or college) may easily lead to infection, by means of coughing, spitting, etc., of a large proportion of the school population. The early removal of such an infective pupil therefore confers the double benefit of treatment for himself and protection for his class-mates.

Infected children from County Donegal are, in most cases, sent to Dublin for treatment as soon as it can be arranged. If they

are capable of being treated locally, or if they refuse to go to Dublin, they are sent to one of the district hospitals where they can be kept under proper supervision and treatment.

The fact that we have fairly satisfactory arrangements for x-ray of patients in the county is of great importance. The diagnosis of pulmonary tuberculosis in children, even more so than in adults, is fraught with pitfalls, and this branch of medicine calls for a great deal of technical skill and experience. In many cases, indeed, the diagnosis must remain in doubt until a satisfactory x-ray photograph of the patient is obtained.

That the importance of radiography in tuberculosis is now universally recognised may be deduced from the following Memorandum submitted by the Tuberculosis Group to the General Council of the Society of Medical Officers of Health in Britain in 1936 :

> "For several years after the inception of tuberculosis schemes the diagnosis of pulmonary tuberculosis was dependent upon clinical methods ; history taking, physical examination, sputum examination, temperature records and comparative weights. Short of finding bacilli in the sputum, or of a post-mortem examination, it was impossible in many cases to confirm the diagnosis that had been made. In consequence, not only were such conditions as bronchitis and bronchiectasis frequently diagnosed as tuberculosis but in the endeavour to get patients under treatment at an early stage of the disease there was a tendency to give them the benefit of the doubt and to regard them as suffering from tuberculosis. There is no doubt that in the past many sanatoria contained a large proportion of such cases and there is good reason to believe that a number of non-tuberculous patients are still treated in sanatoria as tuberculous.
>
> Two illustrative cases may be quoted :—
>
> A farm worker of 38 seen by a Tuberculosis Officer had complained of some shortness of breath for three months and had been confined to bed for two weeks with cough, malaise and a slight pyrexia. On auscultation of the chest, rather fine crepitations were heard over both lungs. A skiagram showed no evidence of tuberculosis, and bronchitis of the small tubes became the probable diagnosis. On the succeeding day the same Officer visited a farmer of 42 with much the same history except that the patient was not pyrexial or confined to bed, the physical signs discovered were almost identical yet in his case a skiagram revealed extensive bitaleral tuberculosis. In both patients the sputum examination was negative. Without x-rays it would have been difficult to differentiate the cause of disability in these two patients.

Chest radiography is to-day essential for the completion of a diagnosis, the casting of a prognosis, and the planning and control of treatment, yet the facilities provided vary widely in different districts and in some of them the existent facilities are only partially utilized. A film should be taken of every case notified or sent to a dispensary for diagnosis, and radiography is also an essential aid to the examination of the most important class of contact—the young adult.

Any skiagram should be a good one, a poor picture is worse than useless. The present minimum requirements are an apparatus capable of giving a good chest film at a focal distance of not less than 4 feet in not more than one-tenth second."

HEART DISEASE AND RHEUMATISM

The total incidence of heart disease was found to be 0.5 per cent. as compared with 0.4 per cent. in 1938. The total number of new cases (30) was practically the same as for 1938 (29). Of the thirty cases, four were considered to be of congenital origin. A definite history of acute rheumatism or scarlet fever was obtainable only in six of the remaining twenty-six.

The incidence of rheumatism is heaviest on the poorer classes, and its first attacks are commonest in children of school age, particularly those suffering from infected tonsils. "Environmental factors are of such importance in the production of juvenile rheumatism that it is hard to escape the conclusion that they play a part in determining the severity of the complaint and thus the likelihood of heart disease. These factors are not so much the concomitants of great poverty, such as squalor, underfeeding, and overcrowding, as of comparative poverty. Housing is important; the cold, damp, jerry-built house, cheaply built on a cheap, damp site is a probable danger; and rheumatic heart disease is admittedly common among children dwelling in basements. Chronic tonsillar infection predisposes strongly not only to juvenile rheumatism but also to rheumatic heart disease; this is shown by the fact that in the acute rheumatism of tonsillectomised children the incidence of heart disease is far lower than in those with infected tonsils." (Miller).

Hereditary predisposition was stressed at one period in the history of the disease, but it is very difficult to obtain convincing proof of this factor. The influence of environment, however, is undoubted. Acute rheumatism is a disease of temperate climates, follows rivers and water-courses, and is particularly common in low-lying districts. It is a disease of winter, though cases may occur at any season. It is much more common in urban than in rural com-

munities, and its incidenec is particularly high in industrial towns (2 per eent.—3 per cent.).

It remains to be seen if the new drugs of the ' Prontosil ' type, which have proved so dramatie in proved streptococcal infections, will have any definite effeet in decreasing the incidence of this crippling disease, with its many disastrous effects on the heart.

IMMUNISATION AGAINST DIPHTHERIA (COUNTY DONEGAL)

NAME OF DISPENSARY DISTRICT.	Number Immunised.
Dungloe No. 1	443
Dungloe (Burtonport)	704
Kilmacrenan and Milford	39
TOTAL	1,186

As will be seen from the table a total of 1,186 children were immunised in 1939. The two-injection method was adopted, as explained in last year's report, using A.P.T. as the antigen. No Schick-testing has been performed, as it is felt that there is available. from many reliable sources, sufficient evidence that the technique adopted will give adequate protection in about 95 per cent. of cases,

In November, 1939, with the initiation of a Scheme in Carrick, it was decided to use two injections of A.P.T., each of $\frac{1}{2}$ c.c., and spaced at an interval of one month. It is now believed, as a result of further experiment, that the interval between doses should be prolonged to two months or even longer.

Sir J. C. G. Ledingham, LL.D., D.Sc., etc., Professor of Bacteriology, University of London, speaking at the Annual Meeting of the British Medical Association, 1939, said: " Of the five infectious diseases with whose prevention by prophylactic inoculation I am dealing (Measles, Scarlet Fever, Diphtheria, Whooping Cough, Influenza), diphtheria undoubtedly merits chief consideration because we now know quite definitely from field trials in other countries that intelligent and persistent immunisation of the child population, starting with the pre-school child one year old, can bring the diphtheria morbidity down to zero. Indeed as that great pioneer in this field, the late Dr. W. H. Park, remarked at the International Congress for Microbiology

in London in 1936, " The control of diphtheria by specific treatment is one of the most gratifying victories of bacteriology."

Professor Ledingham has laid down the following maxims as calculated to give the best results :

(1) A single immunising dose of any antigen is not effective if high and lasting immunity is desired, and, where still used in certain localities, should be abandoned.

(2) A.P.T. (Alum Precipitated Toxoid) is the most efficient antigen, and is easily tolerated in children under 8 years.

(3) There is general agreement that longer intervals between doses, and specially between the first and second dose, are calculated to yield superior results.

(4) At the start of a crusade in any community children from infancy to school-leaving age should be immunised in the largest possible numbers.

(5) As time goes on immunisation would be confined to the pre-school children of 1 to 2 years, and when such children go to school it may be very desirable to give a single reinforcing injection.

(6) In children over 10, T.A.F. is to be preferred to F.T. or A.P.T. unless preliminary detector tests are performed.

(7) Not until some 80 per cent. of the child population under 15 years have been immunised will a material decrease in the incidence rate of diphtheria be realised.

It is believed that a child does not become immune for some three to four months after immunisation.

POLAND.

It may be of interest to note that since immunisation against diphtheria was made compulsory in Poland three years ago, the incidence of the disease has fallen in Warsaw, where 54 per cent. of the child population have been inoculated (pre-war), from 11 per cent. in the non-inoculated to 2 per cent. in the inoculated, and the fatality rate has fallen from 7 to 0.2 per cent. In Lodz, where 90 per cent. of the children have been inoculated, the **morbidity** has fallen from 5 per cent. in the non-inoculated to 1 in the inoculated.

FRANCE.

At a meeting at the Pasteur Institute in March 1939, Surgeon General Dopter traced the behaviour of diphtheria in the French Army since the beginning of 1930. At this stage, diphtheria in several regiments in France and Algeria was proving refractory to prophylactic measures hitherto in fashion—the tracking down of definite and abortive cases, the isolation of the sick, the search after, and isolation of carriers, disinfection and so on. It was then that Surgeon General Dopter took the initiative in combining typhoid immunisation with diphtheria immunisation. The contrast between two control groups was so strikingly in favour of diphtheria immunisation that in December, 1931, it was made compulsory in the Army under certain well-defined conditions. As the diphtheria morbidity declined these conditions were modified so as to favour the more general application of this measure, and in August 1936, immunisation became obligatory for the whole Army and without a preliminary Schick test being required. Among the 163,000 soldiers thus immunised between the beginning of 1930 and October, 1936, the diphtheria rate was only 0.82 per 1,000, whereas the corresponding figure was 9.65 for the 112,000 soldiers who were not immunised. While the diphtheria morbidity in the Army of the East was 10.1 per 1,000 in 1933, it was only 0.6 in 1937.

ITALY.

Immunisation against diphtheria has recently been made compulsory in Italy for children between 2 and 10 years.

HUNGARY.

In Hungary inoculation against diphtheria has recently been made compulsory; by December 31, 1935. more than 1,000,000 children had been immunised.

SCHOOL BUILDINGS

Of the 221 schools examined during the year, the following 100 were adversely reported on:

Ardagh (Raphoe).

Ventilation inadequate because of type of window. Recommend alteration to windows to allow of more full opening. Also recommend partition to allow each teacher a single room.

Ardlaghan (Cloghan).

Roof, walls, floor bad and beyond repair. Windows broken and unsuitable. One of the worst schools in the County. A new school is an urgent necessity.

Aughaclay (Malin).
Sanitary accommodation and ventilation defective.

Balleighan (Manorcunningham).
Sanitary accommodation and ventilation defective. Lighting inadequate. No cloak room. Only one room for two teachers. Recommend partition so that each teacher will have separate classroom. Recommend also that a window be put in back wall.

Ballykerrigan (Cloghan).
Premises considered definitely unsuitable and require to be replaced by modern premises. Building old and damp. No suitable playground. Lavatories bad.

Birdstown (Kilderry).
Lighting defective. Playground unsuitable and scarcely adequate. Recommend that window be opened in S.E. wall.

Boltyfree (Cloghan).
The building is damp, antiquated, and draughty. No playground. No cloak room. Closets unsatisfactory. A new school is required.

Boyagh (Castlefin).
No playground.

Bredagh Glen (Moville).
Lighting inadequate in infants' room. Gallery in this room, which should be removed.

Broadpath (Stranorlar).
Overcrowded. Sanitary accommodation, ventilation and lighting defective. No cloakroom or playground. Water supply for drinking unsatisfactory. Arrangements completed for construction of new school.

Carrickmaquigley (Moville).
Windows placed much too high, causing darkness, especially in Infants' room.

Carnamoyle (Kilderry).
School overcrowded. Cloak room accommodation inadequate. Playground inadequate. Only one room for two teachers. School to be reconstructed in the coming year.

Carrowbeg (Moville).
Sanitary accommodation defective.

Carrowcannon Boys' (Cross Roads—Falcarragh).
Only one room for two teachers. Recommend that it be partitioned. Playground space inadequate. Sanitary accommodation unsuitable.

Carrowcannon Girls' (Cross Roads—Falcarragh).
Overcrowded. Sanitary accommodation, ventilation, heating, and lighting unsatisfactory. No playground. Only one room for two teachers. New school recommended.

Carrowmore (Carndonagh).
Playground space inadequate. One wall in Infants' room damp. (To be attended to by Manager in summer).

Cashelnagore (Cross Roads—Falcarragh).
Playground space inadequate. Position of closets is bad as they are situated high above school and too near entrance doors.

Castlefin Boys' (Castlefin).
School is overcrowded and both teachers work in one room. A new school is strongly recommended.

Castlefin Girls' (Castlefin).
Both teachers work in one room.

Clare (Moville).
Walls in this school are very damp.

Cloughfin (Castlefin).
This school was adversely reported on in 1937 and a new school recommended. The stove in use at present is dangerous as pipe leading to exterior is defective.

Commeen (Cloghan).
The building is antiquated, dark, damp, and overcrowded. See 1937 Report. A new school required.

Convoy (Stranorlar).
Additional fire-place required for satisfactory heating.

Cooladawson (Killygordon).
The building is very old. Lighting and heating inadequate. Cloak room and playground insufficient. A new school required.

Cooley (Moville).
Heating arrangements very unsatisfactory in Infants' room.

Corradooey (Stranorlar).
No cloakroom or playground.

Corryvaddy (Letterkenny).
Sanitary accommodation unsuitable. Lighting blocked by tree in front of seniors' room. No playground.

Croaghan (Ramelton).
No cloak room.

Crosconnell (Clonmany).
Playground too small.

Derrybeg Boys' (Cross Roads—Bunbeg).
Sanitary accommodation defective.

Derryconnor (Cross Roads—Falcarragh).
Playground space inadequate.

Derryhenny (Doochary).
This school was very adversely reported on in 1937. Since then there has been no change for the better. Matters have not proceeded very far as regards the proposed new school. A new school is an urgent necessity.

Dromore (Killygordon).
There is no water convenient to school, which is a hardship in view of the large number of children on roll. A pump should be sunk in the vicinity.

Drumkeen (Stranorlar).
Drinking water obtained from surface well unprotected near school.

Drung (Moville).
Lighting inadequate in infants' room.

Dunfanaghy No. 1 (Dunfanaghy).
Ventilation unsuitable.

Gaddyduff Boys' (Clonmany).
Slightly overcrowded.

Glenalla (Ramelton).
Ventilation unsuitable. No cloak room.

Gleneely (Killygordon).
No cloak room.

Glencoagh (Tanatallon).
Windows in front of school are too small and lighting is deficient in front rooms.

Glenmaquin (1) (Manorcunningham).
Sanitary accommodation open to use by public. Ventilation unsuitable. Cloak room consists of porch. No playground. No water-supply for drinking. Two-teacher school. Recommend erection of partition so that each teacher may have a separate room.

Glenmaquin (2) (Manorcunningham).
No playground. Two-teacher school. Recommend partition to be erected to give each teacher a separate room.

Glentogher (Carndonagh).
One room in old school being used. Lighting is very poor.

Goorey (Malin).
Ventilation defective.

Grousehall (Carndonagh).
Cloak room inadequate. No lavatory basins available. No ventilators.

Horn Head (Dunfanaghy).
No sanitary accommodation. No cloak room.

Inch Island (Kilderry).
Very old school. New school to be built.

Innismean (Cross Roads—Bunbeg).
Ventilation unsuitable. No cloak room or playground. Heating arrangements unsatisfactory.

Inver (Tanatallon).
No water-supply convenient.

Isle of Doagh, or Beltra (Clonmany).
Sanitary accommodation defective.

Kildarragh (Dunfanaghy).
The playground is an open space. Sanitary accommodation unsatisfactory. Ventilation unsuitable. Lighting inadequate. No cloak room. School previously condemned.

Knock (Killygordon).
School premises considered definitely unsuitable. Building

antiquated and in bad state of repair. No playground. Closets very unsuitable.

Knockfola (Cross Roads—Bunbeg).
Playground unsuitable.

Laghey (Laghey).
School dark, damp and cold. Additional fireplace and window required. Both teachers work in one room.

Laghey Bar (Laghey).
The building is antiquated. Ventilation unsatisfactory, lighting bad, heating insufficient. Both teachers work in one room. A new school is recommended.

Letterfad (Tanatallon).
School Medical Inspection held in dwelling house which is being temporarily used as school while school is undergoing alterations and repair.

Letterkenny Convent (Letterkenny).
One room with two teachers. Recommend that it be partitioned.

Lettershambo (Cloghan).
Premises considered definitely unsuitable and require to be replaced by modern premises. Building is old, damp and unsuitable. No sanitary accommodation.

Lismullaghduff (Killygordon).
Playground unsuitable. Additional classroom required.

Lossett (Churchill).
Sanitary accommodation defective. Ventilation unsuitable. Cloak room inadequate. Playground inadequate.

Lunniagh (Cross Roads—Bunbeg).
Floor in one of the rooms defective, causing school to be very cold and draughty. No ventilators, and windows when open cause terrible draughts. Heating arrangements extremely unsatisfactory. Windows on west side defective. No cloak room or playground. New school recommended.

Magheraroarty (Cross Roads—Falcarragh).
Condemned for years. New school partly built, but at a standstill now. Urgently required.

Malin Head (Malin).
Lighting inadequate.

Massinass Boys' (Dunfanaghy).
Two teachers in one room. Recommend partition to give each teacher a separate room.

Massinass Girls' (Dunfanaghy).
Recommend partition so that each of the two teachers may have a separate room.

Meenacahan (Tanatallon).
Floor defective, walls damp, heating and lighting inadequate. New school contemplated.

Meenagowan (Lettermacaward).
Playground muddy and water-logged.

Meencarrigagh (Cloghan).
Playground too small. Closets old and unsuitable.

Meenderry (Cross Roads—Falcarragh).
Overcrowded. Playground inadequate.

Meenglass (Killygordon).
School is definitely unsuitable. It is dark, damp, and not properly ventilated. A new school recommended.

Moville R.C. Boys' (Moville).
Sanitary accommodation and lighting defective.

Muckross (Killybegs).
School premises considered definitely unsuitable. Site bad. Building antiquated. No playground. See 1938 Report.

Munterneese (Tanatallon).
The building is old ; roof, floor and walls in bad condition. Cold and insanitary. The new school contemplated is urgently required.

Murroe (Dunfanaghy).
Heating inadequate. Only one room for two teachers. Provision of additional room recommended.

Ramelton R.C. (Ramelton).
Sanitary accommodation too near school. Cloak room inadequate. Playground inadequate. Lighting in infants' room bad. Infants' room has a gallery—recommend removal. Only two rooms for three teachers.

Raphoe (Raphoe).
Recommend alteration to windows to admit of more satisfactory

ventilation. Consider it very necessary that the town water supply be laid on to the school, for drinking, washing, and for closets.

Ray (Manorcunningham).
Sanitary accommodation defective. Ventilation defective. Cloak room accommodation consists of porch. Water-supply unsatisfactory. Erection of pump, if possible. recommended. No playground.

Robertson (Letterkenny).
Two teachers working in one room.

Rooskey (Castlefin).
Conditions have not improved since 1937 report. A new school is a necessity.

Sessiaghoneill (Killygordon).
Sanitary accommodation defective. No playground. The building is antiquated and badly lighted. A new school is required.

Shallogans (Doochary).
The premises have been previously condemned as unsuitable (1937). Roof, walls and floor in bad condition. No closets. No playground. A new school is badly needed.

St. Egney's (B.), Desertegney (Buncrana).
Cloak room inadequate. School below level of road. Water enters in winter and floods school along the door and wall next road.

St. Eunan's (B.) (Letterkenny).
Overcrowded. Cloakroom inadequate.

St. Joseph's, Lower Illies (Buncrana).
Heating arrangements unsatisfactory in seniors' room.

St. Patrick's, (B.) (Carndonagh).
Walls in all rooms damp.

St Patrick's, Carrowmeenagh (Moville).
Playground space inadequate.

St. Patrick's, Drumfries (Buncrana).
Ventilation unsuitable. Lighting inadequate—probably due to low level of school, and trees. School situated below level of road. Drainage improved and school not now flooded.

Stramore (Churchill).
Sanitary accommodation defective. Cloak room inadequate. Lighting defective.

Stranorlar Robertson (Stranorlar).
Sanitary accommodation defective. Recommend installation of flush closets.

Swanzy (Moville).
Ventilation unsuitable.

Templedouglas (Churchill).
Playground inadequate.

Tiernasligo Girls' (Clonmany).
Only two rooms for the three teachers. Suggest partitioning to make three rooms.

Tievebrack (Castlefin).
School at present overcrowded and both teachers work in one room. An extension to premises is being proceeded with.

Treankeel (Cloghan).
Playground is too small and is waterlogged in wet weather. Requires to be enlarged and drained.

Trentagh (Churchill).
Playground surface unsuitable.

Tullybeg (Ramelton).
Ventilation unsuitable. Cloakroom and playground inadequate. Roof too low. One room for two teachers—recommend partition so that each teacher will have separate room.

Ture (Kilderry).
Seniors' room damp. Requires immediate repair.

Urblereagh (Malin).
Cloak room and playground small. Three teachers and only two rooms. (Improvements are being done in the near future).

Welchtown Robertson (Cloghan).
Playground is too small.

Woodlands (Letterkenny).
School overcrowded. Requires to be enlarged. Only one small room for two teachers. Lighting bad.

SUMMARY OF INSPECTION AND DEFECTS.

TABLE A.

Showing total number of children inspected during the year 1939, grouped according to Dispensary Districts, and the attendances of parents at the actual inspections.

DISPENSARY DISTRICT.	Number on Roll.	Total Number Inspected.	First Inspection.	Second Inspection.	Number whose Parents Present.
BUNCRANA	1,051	518	232	286	183
Drumfries (St. Patrick's)	70	21	10	11	9
Fathan Mura, Iochtarach....	36	24	8	16	4
Kinnego (St. Brigid's)	60	37	24	13	24
Lower Illies (St. Joseph's)	90	60	24	36	20
Mecnagh Boys' (otherwise St. Egney's)	55	14	3	11	4
S.N. an Chroidhe Ro-Naomhtha, Buncrana	326	154	76	78	61
St. Patrick's (G.), Glebe	56	25	12	13	12
St. Columba's (B.), Buncrana	147	94	34	60	34
St. Mary's, Buncrana	102	47	27	20	9
St. Oran's, Buncrana	48	24	9	15	6
St. Barthen's, Tullydish	61	18	5	13	—
CARNDONAGH	688	236	92	144	139
Gleann Daoiligh	14	3	2	1	—
Glentogher Convent	77	49	14	35	30
Naomh Brighde, Carndonagh	102	30	15	15	16
Naomh Columchille, Carndonagh	72	24	11	13	13
Sgoil Padraig Naomhtha, Carndonagh	193	74	23	51	40
Sgoil Padraig, An Ceathramha Mor	55	15	7	8	12
Sgoil Muire, Gleann Dhaoiligh	72	19	10	9	13
St. Patrick's (B.), Carndonagh	103	22	10	12	15
CASTLEFIN	798	428	213	215	219
Alt No. 2	27	8	4	4	2
Ballindrait	23	10	9	1	5
Boyagh	79	14	7	7	4
Carnowen	52	45	14	31	4
Catlefin No. 2	35	16	11	5	8
Castlefin No. 1 (B.)	70	47	25	22	36
Castlefin (G.)	70	49	29	20	32

DISPENSARY DISTRICT.	Number on Roll.	Total Number Inspected.	First Inspection.	Second Inspection.	Number whose Parents Present.
Cloughfin	54	39	20	19	22
Lifford	13	10	7	3	7
Rooskey	46	28	15	13	13
Sgoil Brighde, An Ailt ...	65	21	9	12	15
St. Patrick's, Murlog ...	192	93	44	49	47
Tievebrack	72	48	19	29	24
CHURCHILL	258	112	47	65	17
Ednacarnon	47	25	10	15	2
Gartan	16	5	2	3	—
Keelogs (2)	42	14	2	12	2
Lossett	26	16	7	9	1
Rashedog	49	6	2	4	3
Stramore ...	23	8	4	4	2
Templedouglas (or Drumbologue)	49	28	15	13	4
Traintagh	16	10	5	5	3
CLOGHAN	472	307	159	148	179
Ardlaghan	19	15	11	4	3
Ballykerrigan	30	23	13	10	13
Boltifree ...	31	32	15	17	15
Brockagh	42	29	14	15	26
Commeen	58	30	13	17	16
Dooish	79	48	23	25	31
Letterbrick	47	28	20	8	21
Lettershambo	29	6	6	—	3
Meencarrigagh	36	36	15	21	25
Sgoil Trean Caoil	60	40	19	21	23
Welshtown ...	41	20	10	10	3
CLONMANY	602	148	56	92	44
Croseonnell	75	21	8	13	5
Gaddyduff (B.)	124	26	8	18	10
Gaddyduff (G.)	136	24	15	9	2
Rashenny	53	15	3	12	10
Sgoil Bheal Tragha (Island of Doagh)	49	12	8	4	4
Tiernasligo (B.)	75	12	6	6	1
Tiernasligo (G.)	90	38	8	30	12
CROSS ROADS (Falcarragh)	957	343	146	197	175
Ballyboes	133	47	31	16	40
Carrowcannon (B.)	64	14	8	6	1
Carrowcannon (G.)	68	23	12	11	13
Cnoc na Naomh, Gortahork	122	88	24	64	30
Innishboffin Island ...	44	15	1	14	10
Magheroarty	56	14	7	7	11
Meenderry	111	39	17	22	13
Ray, Falcarragh	11	3	1	2	1
Sgoil Caiseal na gCorr	127	66	26	40	30
Sgoil Gort an Choircc	221	34	19	15	26

DISPENSARY DISTRICT.	Number on Roll.	Total Number Inspected.	First Inspection.	Second Inspection.	Number whose Parents Present.
CROSS ROADS (Bunbeg)	925	367	122	245	208
Bun an Inbhir	94	43	11	32	21
Dunlewey	73	44	11	33	20
Gola Island	18	15	2	13	4
Inishmeen Island	20	11	6	5	4
Knockastolar	161	36	9	27	25
Lunniagh	114	62	15	47	40
Meenacladdy	104	39	20	19	24
Sgoil Mhuire (B.), Derrybeg	72	28	16	12	19
Sgoil Mhuire (C.), Derrybeg	79	33	15	18	20
Sgoil Columcille, Cnoc Fola	67	19	5	14	?
Sgoil Padraig, Dore	81	13	7	6	6
Thorr	42	24	5	19	22
DOOCHARY	441	235	85	150	150
Ballinamore	63	20	6	14	9
Derryhenny	47	30	7	23	20
Dubh Choradh	71	44	15	29	33
Glenleighan	48	31	10	21	22
Kingarrow	26	15	3	12	4
Lettermacaward (Robt.)	10	5	1	4	2
Loughmuck	14	11	6	5	10
Min a' Ghabhann	40	18	13	5	11
Sgoil Dumhaighe	46	28	15	13	17
Sgoil Leitir Mhic An Bhaird	54	26	8	18	16
Shallogans	22	7	1	6	6
DUNFANAGHY	528	256	73	183	156
Ballymore	15	8	—	8	8
Creeslough	22	11	1	10	5
Dunfanaghy (1)	26	5	1	4	—
Dun Fionnachaidh	55	27	4	23	11
Druim na Rath	100	45	11	34	40
Fothar	47	30	7	23	20
Glasson	29	12	9	3	8
Kildarragh	47	19	7	12	12
Massinass (B.)	56	21	3	18	17
Massinass (G.)	56	35	13	22	22
Murroe	49	29	15	14	11
Horn Head	26	14	2	12	2
GLENTIES	107	83	48	35	60
Glenties Convent	83	56	35	21	41
Tullymore	24	27	13	14	19
KILDERRY	417	156	74	82	60
Birdstown	64	40	16	24	20
Carnamoyle	62	15	8	7	2
Carnshannagh (or Burnfoot)	11	5	3	2	—
Fahan (or Gort)	18	11	3	8	2
Inch Island	51	23	11	12	16

DISPENSARY DISTRICT.	Number on Roll.	Total Number Inspected.	First Inspection.	Second Inspection.	Number whose Parents Present.
Muff	23	6	5	1	2
St. Mura's, Burnfoot	129	36	21	15	8
Three Trees	7	5	—	5	—
Ture (or Gortin)	52	15	7	8	10
KILLYBEGS	241	98	21	77	74
Fintra	53	29	8	21	15
Muckross	16	5	—	5	—
Niall Mor, Killybegs	118	31	7	24	28
Sgoil Roisin, Killybegs	16	12	6	6	10
Shalvey	38	21	—	21	21
KILLYGORDON	546	299	166	133	213
Cooladawson	45	36	24	12	25
Dromore	120	43	22	21	27
Donaghmore (2)	50	39	10	29	18
Gleneely	37	11	3	8	10
Killygordon	17	14	3	11	3
Knoek	61	41	24	17	40
Lismullaghduff	50	19	10	9	15
Meenglass	37	19	12	7	14
Sessiaghoneill	76	30	23	7	28
Sgoil Padraig Naomhtha, Meenreagh	53	47	35	12	33
LAGHEY	277	184	50	134	109
Ballinakillew	29	7	2	5	4
Drumnahoul	19	9	1	8	1
Laghey	43	23	6	17	14
Laghey Bar	64	62	20	42	47
Sgoil na gCeithre Maighistri	52	36	8	28	11
Shannagh	38	26	9	17	15
Tullynaught	32	21	4	17	17
LETTERKENNY	804	321	149	172	150
Ballystrang	24	13	3	10	10
Barkhall	57	18	6	12	10
Cashelshanaghan	25	7	7	—	4
Corovaddy	43	13	7	6	3
Illistrin (1)	41	23	14	9	13
Illistrin (2)	15	2	—	2	1
Letterkenny (Robt.)	37	11	4	7	3
Sgoil Cloehar Columeille	318	136	82	54	85
St. Eunan's (Monastery)	180	86	20	66	15
Woodland	64	12	6	6	6
MALIN	568	165	54	111	72
Aughaclay	103	19	5	14	2
Culdaff	16	2	1	1	1
Goorey	12	5	2	3	1
Malin Head	78	16	12	4	8

DISPENSARY DISTRICT.	Number on Roll.	Total Number Inspected.	First Inspection.	Second Inspection.	Number whose Parents Present.
Malin	18	11	3	8	3
Naomh Buadain, Culdaff	57	22	11	11	15
Sgoil Chuil Caonaigh	163	58	12	46	28
Sgoil an Iorbaill Riabhaigh	121	32	8	24	14
MANORCUNNINGHAM	428	158	92	66	42
Balleighan	80	32	16	16	6
Ballyholey	34	11	5	6	3
Glenmaquin (I)	36	10	7	3	1
Glenmaquin (II)	35	7	7	—	2
Naomh Columcille .... Manorcunningham	112	60	39	21	4
St. Patrick's, Lurgybrack	78	31	14	17	23
Ray	53	7	4	3	3
MOVILLE	925	406	106	300	158
Bredagh Glen	38	20	2	18	3
Carrowkeel	37	12	4	8	9
Clunelly	62	17	7	10	5
Carrickmaquigley	36	17	4	13	12
Clare	33	9	2	7	2
Castleeary	15	2	—	2	—
Carrowbeg	7	4	1	3	1
Drung	53	19	7	12	3
Glenagivney	48	18	3	15	10
Moville Convent	125	53	7	46	36
Moville (B.)	101	41	7	34	8
Sgoil Naomh Ultain, Bailc Charraighe	59	37	7	30	15
Sgoil Colmcille, Druim a' Mhaoir	88	55	16	39	17
Sgoil Mhuire, Shrubh	57	31	19	12	17
Sgoil Brighde, Moville	39	6	1	5	1
St. Patriek's, Carrowmenagh	60	24	4	20	14
St. Columb's, Moville	19	9	3	6	2
Swanzy	15	11	3	8	1
Whitecastle (or Cabry)	33	21	9	12	2
RAMELTON	372	172	91	81	46
Browncknowe	15	3	1	2	—
Croaghan	16	1	1	—	—
Glenalla, Ray	13	8	7	1	2
Mecnatole	16	7	7	—	—
Ramelton (Mixed)	66	24	13	11	1
Ramelton	125	66	43	23	19
Ray, Rathmullan	25	13	2	11	4
Sgoil na Coilleadh Crine	46	18	6	12	2
Tullybeg	50	32	11	21	18
RAPHOE	653	285	147	138	154
Ardagh	56	30	19	11	18
Craigadooish	16	6	3	3	—

DISPENSARY DISTRICT.	Number on Roll.	Total Number Inspected.	First Inspection.	Second Inspection.	Number whose Parents Present.
Castletown	34	12	4	8	7
Drumbeg	35	18	15	3	4
Drumucklagh	66	40	20	20	34
Naomh Baithin ..	160	56	21	35	32
Raphoe (Mixed) ..	144	51	24	27	20
Raphoe (Robt.)	45	16	9	7	10
St. Johnston (1)	47	25	11	14	15
Raphoe (Wilson) ..	50	31	21	10	14
STRANORLAR .	616	309	146	163	179
Augheygalt .	34	16	7	9	12
Broadpath	61	42	24	18	26
Corradooey .	19	5	1	4	3
Convoy ...	45	12	5	7	—
Cloghroe	28	12	9	3	7
Lisinisk	35	8	2	6	4
Meenbane ...	25	7	4	3	6
Sgoil Naomh Padraig, Drumkeen	83	67	30	37	44
Stranorlar (B)	106	54	26	28	28
Stranorlar (G.)	123	56	20	36	31
Stranorlar (Robt.)	57	30	18	12	18
TANATALLON	597	307	119	188	211
Drimeoe	17	3	—	3	3
Drumnaherk ...	46	26	15	11	23
Frosses	104	48	20	28	33
Glencoagh (Mixed)	116	48	19	29	33
Inver	36	19	10	9	10
Meenacahan	51	6	6	—	6
Munterneese	38	22	10	12	10
Sgoil an Aird Bhain	41	27	7	20	11
Sgoil an Chillin	62	35	9	26	25
Sgoil Leitir Fhada	50	37	13	24	24
Sgoil Leitreach Mor	36	36	10	26	33
GRAND TOTAL	13,281	5,893	2,488	3,405	2,998

N.B.—The "Number on Roll" given in Table A refers to **the schools which were actually inspected** in a particular Dispensary District during the year 1939. In some Dispensary Districts the inspection of the schools was not completed during the year.

TABLE B.

SHOWING STATE OF CHILDREN IN MATTERS OF CLOTHING, FOOTGEAR AND CLEANLINESS.

	Unsatisfactory.	Percentage	Very Unsatisfactory.	Percentage.	Total.	Percentage.
Clothing	242	4.1	34	0.6	276	4.7
Footgear	146	2.5	28	0.5	174	2.9
Cleanliness of Head	559	9.5	205	3.5	764	12.9
Cleanliness of Body	452	7.7	159	2.7	611	13.7

TABLE C.

GIVING A SUMMARY OF THE DEFECTS DISCOVERED DURING THE YEAR 1939.

DEFECT OR DISEASE.	TOTAL.	Percentage.	Marked Degree or for Treatment.	Percentage.	Moderate Degree or for Observation.	Percentage.
Malnutrition	436	7.4	47	0.8	389	6.6
Ringworm of Body	2					
Ringworm of Head	3					
Impetigo	8	0.9				
Scabies	24					
Other Skin Diseases	16					
Carious Teeth	3,252	55.2	2,747	46.6	505	8.6
Defective Vision	984	16.8	724		260	
Squint	100	1.8				
Other Eye Diseases	45	0.7				
Hearing	9	0.2				
Ear Diseases	17	0.3				
Speech	28	0.5				
Tonsils and Adenoids	2,118	35.9	1,656	28.1	462	
Rhinitis	12					
Nasal Obstruction	4	0.3				
Cervical Glands	269	4.6	78		191	
Submaxillary Glands	30	0.5	7		23	
Heart Disease (Functional)	6	0.1				
Heart Disease (Organic)	67	1.1				
Anaemia	82	1.4	31	0.5	51	
Bronchitis	68					
Other Non-Tuberculous Lung Conditions	8	1.3				
Definite Pulmonary Tuberculosis	Nil.					
Suspected Pulmonary Tuberculosis	56	0.9				
Surgical Tuberculosis	14	0.2				
Rickets	31					
Hernia	7					
Epilepsy	5					
Other Nervous Conditions	7					
Postural Defects	130					
Deformities	82					
Infectious or Contagious Diseases	4					
Mental Condition	11		4		7	
Other Diseases or Defects	50					

TABLE D.

SHOWING THE NUMBER OF CHILDREN UNVACCINATED ACCORDING TO DISPENSARY DISTRICTS.

DISPENSARY DISTRICT	Number Inspected.	Number Unvaccinated.
Buncrana	518	13
Carndonagh	236	9
Castlefin	428	37
Churchill	112	—
Clonmany	148	3
Cloghan	307	21
Cross Roads (Falcarragh)	343	34
Cross Roads (Bunbeg)	367	5
Doochary	235	29
Dunfanaghy	256	185
Glenties	83	4
Kilderry	156	10
Killybegs	98	4
Killygordon	299	23
Laghey	184	4
Letterkenny	321	18
Malin	165	9
Manorc unningham	158	14
Moville	406	23
Ramelton	172	2
Rapnoe	285	15
Stranorlar	309	43
Tanatallon	307	5
TOTAL	5,893	510

TABLE E.

Classification of certain diseases and defects found during School Medical Inspection in the Year 1939.

SKIN DISEASES.	
Alopecia Areata	3
Eczema	3
Furunculosis	3
Ichthyosis	2
Impetigo	8
Moles	2
Psoriasis	1
Ringworm of Body	2
Ringworm of Head	3
Scabies	24
Urticaria	1
Other Conditions (Unclassified)	1
TOTAL	53
EYE DISEASES.	
Albinism	3
Blepharitis	28
Cataract	1
Congenital deformity of Pupil	1
Conjunctivitis	3
Corneal Opacities	3
Defective Vision	984
Ptosis	2
Strabismus	100
Synechia	1
Other Conditions (Unclassified)	3
TOTAL	1,129
EAR DISEASES.	
Defective Hearing	9
Otitis Media	4
Otorrhoea	13
TOTAL	26
NON-PULMONARY TUBERCULOSIS.	
Tabes Mesenterica	4
Tuberculosis of Bone	2
Tuberculosis of Glands	2
Tuberculosis of Joints	6
TOTAL	14
NERVOUS DISEASES.	
Chorea	2
Convulsions	1
Epilepsy	5
Nocturnal Enuresis	4
TOTAL	12
DEFORMITIES.	
Birth Palsy	3
Congenital Deformities	3
Congenital Dislocation	2
Club Fingers	1
Genu Valgum	5
Hallux Valgus	1
Pes Planus	16
Rachitic Deformities	18
Scoliosis	3
Sequel to Injury	12
Sequel to Polio-encephalitis (Paresis, etc.)	5
Talipes	3
Torticollis	3
Webbed Fingers	2
Webbed Toes	2
Other Conditions (Unclassified)	3
TOTAL	82
OTHER DISEASES OR DEFECTS.	
Alvelor Abscess	1
Angioma	1
Cyst on Ankle	2
Cyst on back of Knee	1
Cyst on Cheek	1
Cyst on Wrist	1
Epistaxis	2
Haemophilia	1
Mongolism	3
Parasites	1
Phimosis	3
Thyroid Disorders	7
Pyorrhoea	1
Rheumatism	6
Spastic Paralysis	2
Tympanites	1
Varicose Veins	1
Other Conditions (Minor Defects)	15
TOTAL	50

SUMMARY OF TREATMENT.

TABLE F.

Showing the number of operations for the removal of enlarged or diseased tonsils and adenoids in the various county institutions during the year 1939.

NAME OF INSTITUTION.	Number Treated
Ballyshannon District Hospital	18
Donegal District Hospital	—
Letterkenny District Hospital	304
Lifford District Hospital	236
TOTAL	558

TABLE G.

GIVING DETAILS OF DENTAL CLINICS HELD DURING THE YEAR 1939.

Total Number of Clinics held.....	61
Number of Children in Attendance	1,884
Number of Children Treated	1,866

TABLE H.

GIVING DETAILS OF EYE CLINICS CONDUCTED BY THE COUNTY OPHTHALMIC SURGEON (Appointed September, 1939).

Number of Children Examined	154
Number of Children for whom Glasses were prescribed	149

TABLE I.

GIVING SUMMARY OF TREATMENT AFFORDED AT THE EYE AND EAR HOSPITAL, DERRY, DURING THE YEAR, 1939.

1.—EXTERN DEPARTMENT.	
Number of Children in Attendance	178
Number of Children Treated	178
2.—INTERN DEPARTMENT.	
Number of Children Admitted and Treated	5
Number of Children for whom Glasses were prescribed in the Eye and Ear Hospital.	166

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